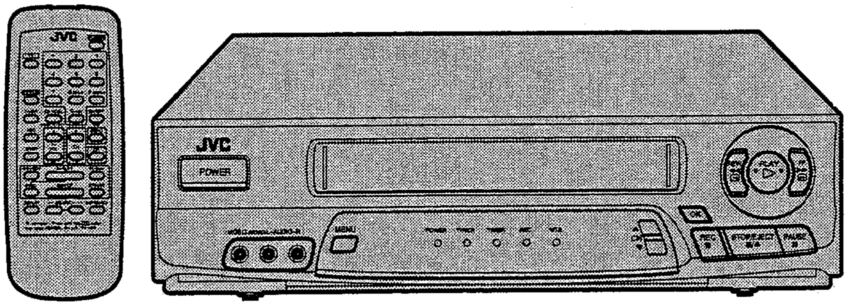
JVC

SERVICE MANUAL

VIDEO CASSETTE RECORDER

HR-A53U



VHS
Hi-Fi

Regarding service information other than these sections, refer to the HR-J643U service manual (No. 82574). Also, be sure to note important safety precautions provided in the service manual.

SPECIFICATIONS

GENERAL

Power requirement	AC 120 V∿ , 60 Hz
Power consumption	21 W (HR-A53U) 14 W (HR-A33U)
Temperature	
Operating	5°C to 40°C (41°F to 104°F)
Storage	–20°C to 60°C (–4°F to140°F)
Operating position	Horizontal only
Dimensions (W x H x D)	360 x 94 x 276 mm (14-3/16" x 3-3/4" x 10 -7/8")
Weight	3.4 kg (7.5 lbs)
Format	VHS NTSC standard
Maximum recording time	
SP	210 min. with ST-210 video cassette
EP	630 min. with ST-210 video cassette

VIDEO/AUDIO

Signal system	NTSC-type color signal and EIA monochrome signal, 525 lines/60 fields
Recording/ Playback system	DA-4 (Double Azimuth) head helical scan system
Signal-to-noise ratio	45 dB
Horizontal resolution	240 lines
Frequency range	
Normal audio	70 Hz to 10,000 Hz
Hi-Fi audio (HR-A53U Only)	20 Hz to 20,000 Hz
Input/Output	RCA connectors (IN x 1, OUT x 1)

TUNER

Tuning system	Frequency-synthesized tuner
Channel coverage	
VHF	Channels 2–13
UHF	Channels 14–69
CATV	113 Channels
RF output	Channel 3 or 4 (switchable; preset to Channel 3 when shipped) 75 ohms, unbalanced

TIMER

Clock reference	Quartz
Program capacity	1-year programmable timer/ 8 programs
Memory backup time	Approx. 3 min.

ACCESSORIES

Provided accessories	RF cable (F-type), Infrared remote control unit, "AA" battery x 2

Specifications shown are for SP mode unless otherwise specified.
E. & O.E. Design and specifications subject to change without notice.

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5. PARTS LIST

5.2 CABINET AND CHASSIS ASSEMBLY <M2> 5-2

The following table indicate different points between models HR-J643U and HR-A53U.

MODEL / ITEM	HR-J643U	HR-A53U
BEST SYSTEM	ACTIV VIDEO CAL.	AUTO PICTURE
FDP	○	—
LED	—	○
CHILD LOCK	○	—
INSTANT REVIEW	○	—
COUNTER MEMORY	○	—
AUTO CLOCK	○	—
REMOTE CONTROLLER	C.BOX/DBS MBR	NON MBR

NOTE : • Mark ○ is used. • Mark — is not used.

The following table indicate different parts number between models HR-J643U and HR-A53U.

PACKING AND ACCESSORY ASSEMBLY<M1>

REF.NO.	MODEL / ITEM	HR-J643U	HR-A53U
101	PACKING CASE	LP30154-001A	LP30154-019A
⚠ 106	REMOTE CONTROLLER	LP20034-002A	LP20049-002A
⚠ 110	INSTRUCTIONS	LPT0002-001A	LPT0002-008A
113	Q.START SHEET	PU36629-21	PU36629-24

Note : · Mark — is not used.

CABINET AND CHASSIS ASSEMBLY <M2>

	MODEL		
REF.NO.	ITEM	HR-J643U	HR-A53U
150	FRONT PANEL ASSEMBLY	PQ11883V	PQ11895R-10
150A	CASSETTE DOOR	PQ21884-21	PQ21884-28
⚠ 151	TOP COVER	PQ11898-1-7	PQ11898-3-7

MAIN BOARD ASSEMBLY <03>

	MODEL		
REF.NO.	ITEM	HR-J643U	HR-A53U
PW1	MAIN BOARD ASSEMBLY	PB11043A1-02	PB11043D1-02
IC701	VQP IC(MCU)	M37774M9H229GP	—
IC702	IC	X24C01AP	—
IC1301	IC(OSD)	LC74785-9644	LC74783-9179
IC1501	IC	UPC1854GT	UPC1852GT
Q3	TRANSISTOR	—	2SB1218(QR)
Q11	TRANSISTOR	UN511E	—
Q12	TRANSISTOR	UN511E	—
Q104	TRANSISTOR	UN521E	—
Q105	TRANSISTOR	UN511E	—
Q106	TRANSISTOR	UN521E	—
Q1005	TRANSISTOR	—	2SD1819A(RS)
Q1006	TRANSISTOR	—	2SB1218A(RS)
Q1007	TRANSISTOR	—	UN5211
D102	DIODE	1N4148M	—
D303	DIODE	RB721Q	—
D958	ZENER DIODE	UZ30BSA	—
D960	DIODE	1N4148M	—
D968	FR DIODE	AU01Z	—
D969	FR DIODE	AU01Z	—
D1004	DIODE	—	1N4148M
D1206	ZENER DIODE	RD9.1ES-T1B2	—
D1223	DIODE	—	1N4148M
D1224	DIODE	1N4148M	—
D1303	DIODE	—	1N4148M
D1304	DIODE	—	1N4148M
R17	RESISTOR	—	QRSA08J-153YN
R18	RESISTOR	—	QRSA08J-103YN

Note : · Mark — is not used.

REF.NO.	MODEL ITEM	HR-J643U	HR-A53U
R19	RESISTOR	—	QRSA08J-0R0Y
R66	RESISTOR	QRSA08J-0R0Y	—
R104	RESISTOR	QRSA08J-823YN	—
R717	RESISTOR	QRD161J-102	—
R738	RESISTOR	—	QRSA08J-102YN
R767	RESISTOR	QRSA08J-153YN	QRSA08J-822YN
R768	RESISTOR	QRD161J-153	QRD161J-822
⚠ R957	FUSIBLE RESISTOR	QRZ0077-101X	—
R970	OMF RESISTOR	QRG01DJ-240X	—
R1011	RESISTOR	—	QRSA08J-0R0Y
R1030	RESISTOR	—	QRSA08J-471YN
R1031	RESISTOR	—	QRSA08J-184YN
R1032	RESISTOR	—	QRSA08J-223YN
R1033	RESISTOR	—	QRSA08J-562YN
R1034	RESISTOR	—	QRSA08J-822YN
R1035	RESISTOR	—	QRSA08J-122YN
R1042	RESISTOR	—	QRSA08J-103YN
R1115	RESISTOR	—	QRSA08J-102YN
R1210	RESISTOR	QRSA08J-103YN	—
R1302	RESISTOR	QRD161J-102	—
R1303	RESISTOR	QRSA08J-222YN	—
R1305	RESISTOR	QRSA08J-103YN	QRSA08J-0R0Y
R1309	RESISTOR	—	QRSA08J-103YN
R1310	RESISTOR	QRSA08J-103YN	—
R1311	RESISTOR	—	QRSA08J-470YN
R3102	RESISTOR	—	QRSA08J-0R0Y
C104	CAPACITOR	QCYA1EK-104	QCYA1HK-222
C121	CAPACITOR	QCYA1EK-104	—
C730	TRIM CAPACITOR,TIMER CLOCK	QAT3120-300Z	—
C951	E CAPACITOR	QEMU0JM-227	—
C960	E CAPACITOR	QETC1HM-106	—
C961	CAPACITOR	QCFA1HZ-103	—
C1030	E CAPACITOR	—	QETC1HM-104
C1034	CAPACITOR	—	QCFB1EZ-223
C1035	E CAPACITOR	—	QETC1HM-225
C1206	E CAPACITOR	QETC1HM-106	—
C1207	CAPACITOR	QCBB1HJ-102	—

Note : · Mark — is not used.

REF.NO.	MODEL ITEM	HR-J643U	HR-A53U
C1315	CAPACITOR	QCYA1HK-103	—
⚠ X702	CRISTAL RESONATOR	YU40141	QAX0304-001
W1	RESISTOR	—	QRSA08J-0R0Y
W4	RESISTOR	QRSA08J-0R0Y	—
W16	RESISTOR	QRSA08J-0R0Y	—
LF1001	LC TRAP	—	PELN0806
J1201	PIN JACK,VIDEO IN	PEMC1162	PU60613-5
J1202	PIN JACK(SW),AUDIO L IN	PEMC1158	PEMC1159
J1203	PIN JACK(SW),AUDIO R IN	PEMC1158	PEMC1159
DI1201	FL TUBE	QLF0004-001	—
CN1201	CONNECTOR,(1-7) LED	—	PEMC0714-007

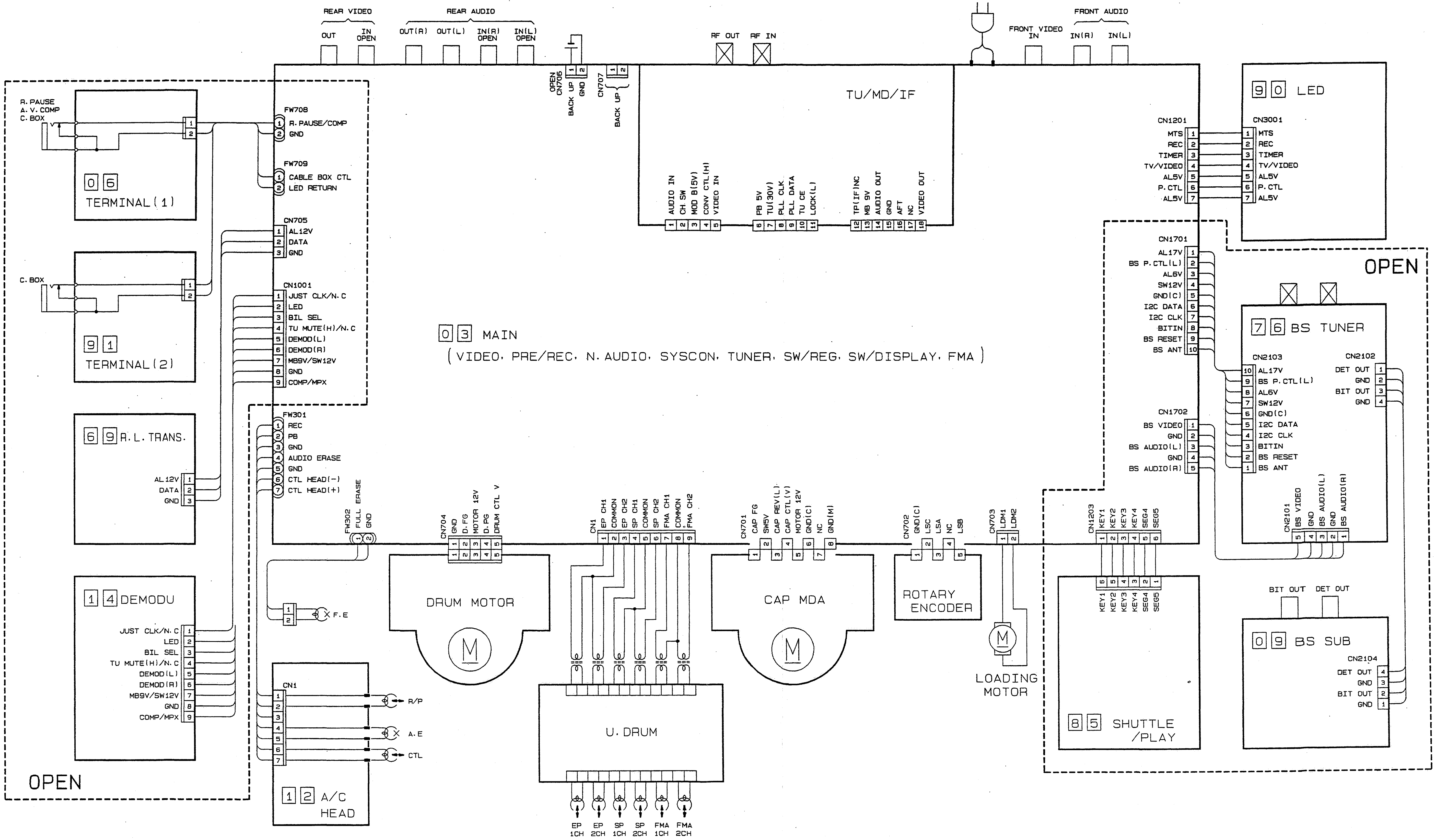
LED BOARD ASSEMBLY <90>

REF.NO.	MODEL ITEM	HR-J643U	HR-A53U
PW1	LED BOARD ASSEMBLY	—	PB20674A
D3001	LE DIODE,POWER	—	SLR-342VR3F
D3002	LE DIODE,TV/VIDEO	—	SLR-342MG3F
D3003	LE DIODE,TIMER	—	SLR-342MG3F
D3004	LE DIODE,REC	—	SLR-342VR3F
D3005	LE DIODE,MTS	—	SLR-342MG3F
R3001	RESISTOR	—	QRD161J-331
R3002	RESISTOR	—	QRD161J-331
R3003	RESISTOR	—	QRD161J-331
R3004	RESISTOR	—	QRD161J-331
R3005	RESISTOR	—	QRD161J-331
HD1	HOLDER(LED)	—	PQ35480
CN3001	CONNECTOR,(1-7) MAIN	—	PEMC0713-107

Note : · Mark — is not used.

SECTION 4
CHARTS AND DIAGRAMS

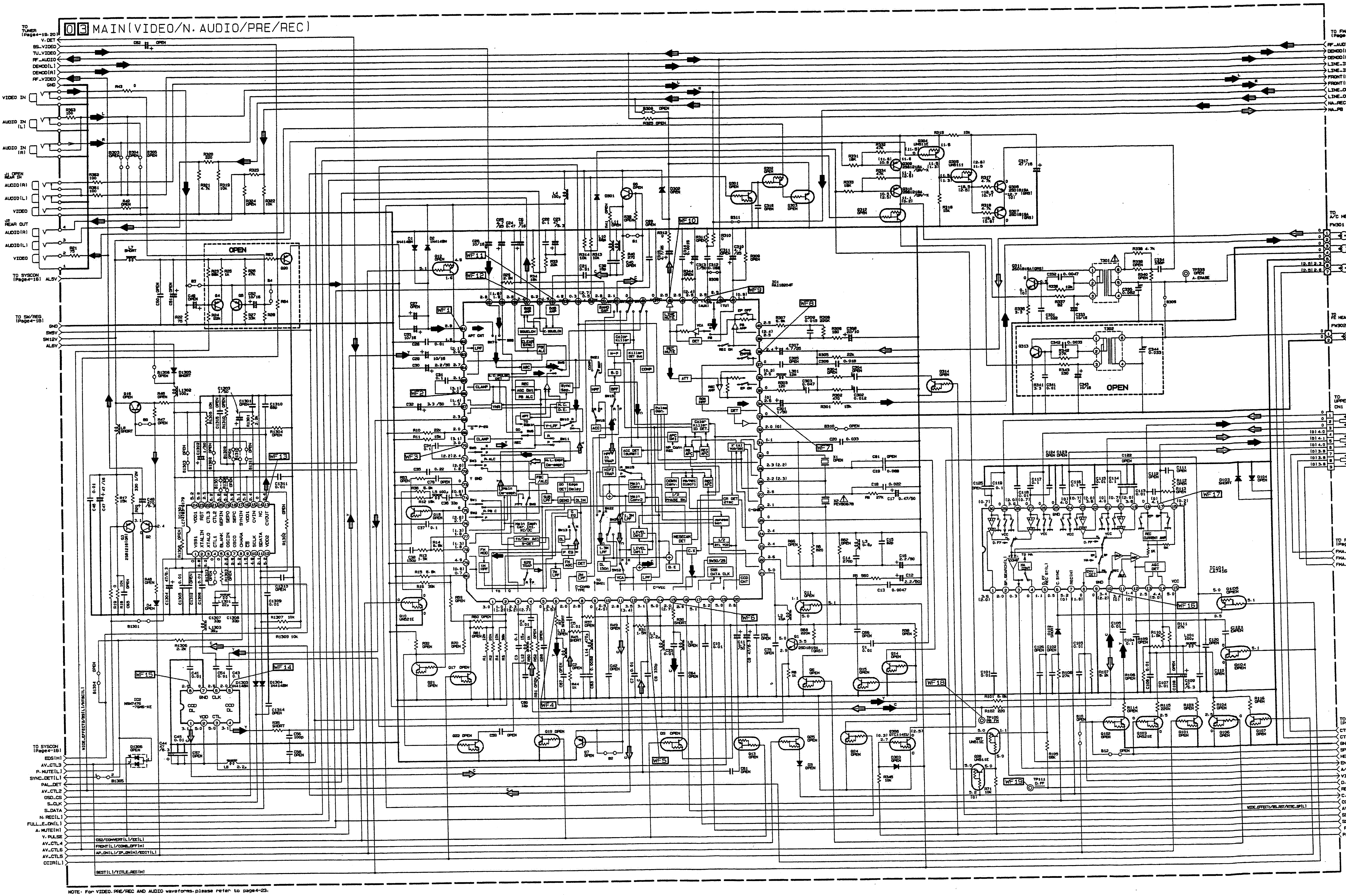
4.1 BOARD INTERCONNECTIONS



REAR VIDEO
OUT
IN OPEN
REAR AUDIO
OUT(R)
OUT(L)
IN(R) OPEN
IN(L) OPEN
RF OUT
RF IN
AC INPUT AC120V 60Hz
FRONT VIDEO IN
FRONT AUDIO
IN(R)
IN(L)
OPEN CN706 BACK UP GND
CN707 BACK UP
TU/MD/IF
AUDIO IN
CH SW
MOD B(5V)
CONV CTL(H)
VIDEO IN
PB 5V
TU(30V)
PLL CLK
PLL DATA
TU CE
LOCK(L)
TP(IF)NC
MB 9V
AUDIO OUT
GND
AFT
NC
VIDEO OUT
R. PAUSE
A. V. COMP
C. BOX
06 TERMINAL(1)
C. BOX
91 TERMINAL(2)
69 R. L. TRANS.
AL12V
DATA
GND
14 DEMODU
JUST CLK/N. C
LED
BIL SEL
TU MUTE(H)/N. C
DEMOD(L)
DEMOD(R)
MB9V/SW12V
GND
COMP/MPX
OPEN
FW708
R. PAUSE/COMP
GND
FW709
CABLE BOX CTL
LED RETURN
CN705
AL12V
DATA
GND
CN1001
JUST CLK/N. C
LED
BIL SEL
TU MUTE(H)/N. C
DEMOD(L)
DEMOD(R)
MB9V/SW12V
GND
COMP/MPX
FW301
REC
PB
GND
AUDIO ERASE
GND
CTL HEAD(-)
CTL HEAD(+)
03 MAIN
(VIDEO, PRE/REC, N. AUDIO, SYSCON, TUNER, SW/REG, SW/DISPLAY, FMA)
FW302 FULL ERASE GND
F. E
CN1
R/P
A. E
CTL
12 A/C HEAD
CN704
GND
D. FG
MOTOR 12V
D. PG
DRUM CTL V
DRUM MOTOR
CN1
EP CH1
COMMON
EP CH2
SP CH1
COMMON
SP CH2
FMA CH1
COMMON
FMA CH2
U. DRUM
EP 1CH
EP 2CH
SP 1CH
SP 2CH
FMA 1CH
FMA 2CH
CN701
CAP FG
SW5V
CAP REV(L)
CAP CTL(V)
MOTOR 12V
GND(C)
NC
GND(M)
CAP MDA
CN702
GND(C)
LSC
LSA
NC
LSB
ROTARY ENCODER
CN703
LDM1
LDM2
LOADING MOTOR
CN1203
KEY1
KEY2
KEY3
KEY4
SEG4
SEG5
85 SHUTTLE /PLAY
CN1201
MTS
REC
TIMER
TV/VIDEO
AL5V
P. CTL
AL5V
90 LED
CN3001
MTS
REC
TIMER
TV/VIDEO
AL5V
P. CTL
AL5V
CN1701
AL17V
BS P. CTL(L)
AL6V
SW12V
GND(C)
I2C DATA
I2C CLK
BITIN
BS RESET
BS ANT
CN1702
BS VIDEO
GND
BS AUDIO(L)
GND
BS AUDIO(R)
OPEN
76 BS TUNER
CN2103
AL17V
BS P. CTL(L)
AL6V
SW12V
GND(C)
I2C DATA
I2C CLK
BITIN
BS RESET
BS ANT
CN2102
DET OUT
GND
BIT OUT
GND
CN2101
BS VIDEO
GND
BS AUDIO(L)
GND
BS AUDIO(R)
BIT OUT
DET OUT
09 BS SUB
CN2104
DET OUT
GND
BIT OUT
GND

90	LED
12	A/C HEAD
03	MAIN
NO	NAME

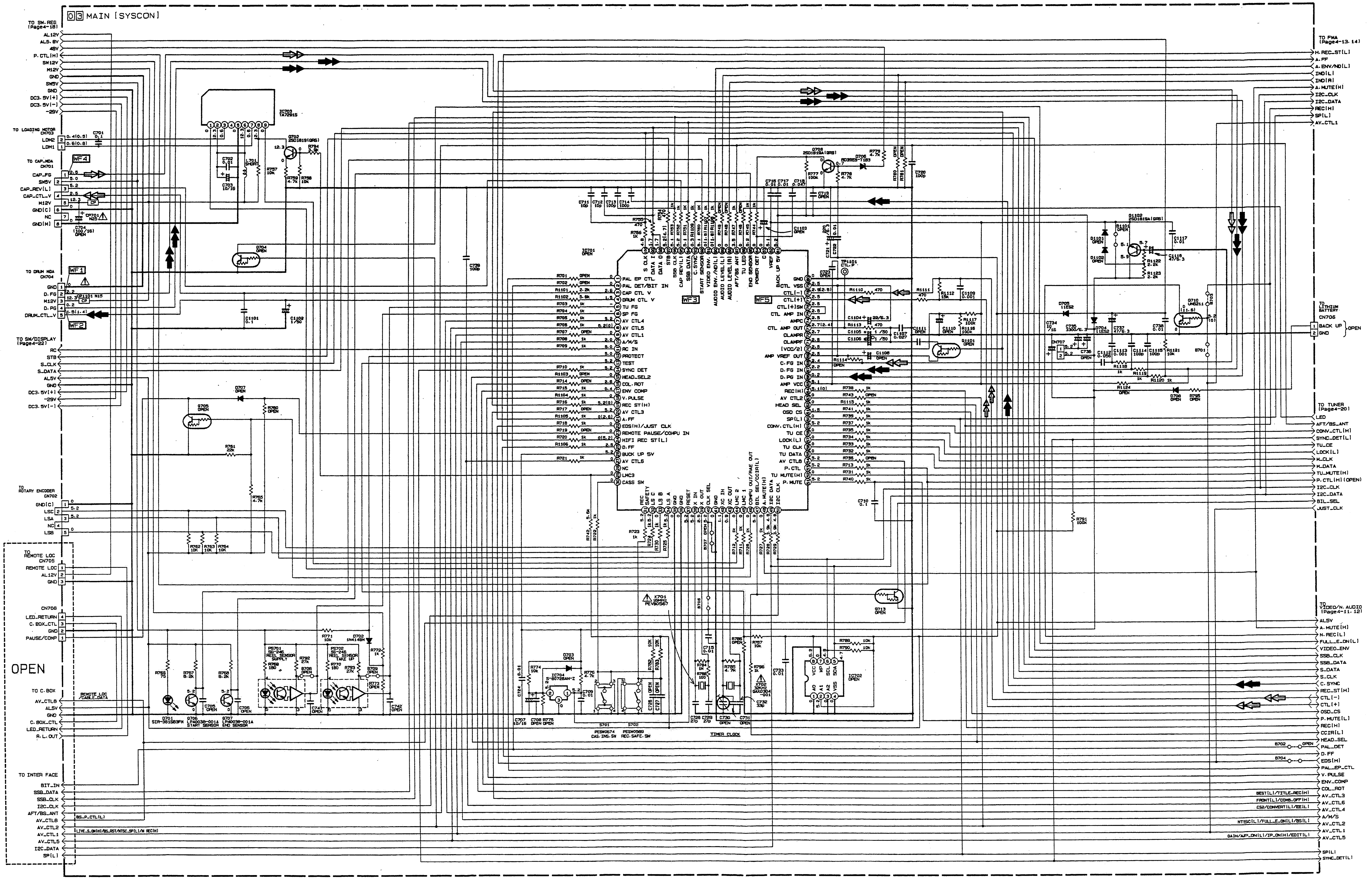
4.5 VIDEO, PRE/REC AND AUDIO SCHEMATIC DIAGRAM



03 MAIN(VIDEO/N. AUDIO/PRE/REC)
TO TUNER (Page4-19,20)
V.DET
BS_VIDEO
TU_VIDEO
RF_AUDIO
DEMOD(L)
DEMOD(R)
RF_VIDEO
GND
J1201 FRONT VIDEO IN
J1202 FRONT AUDIO IN (L)
J1203 FRONT AUDIO IN (R)
J1 OPEN REAR IN
AUDIO(R)
AUDIO(L)
VIDEO
J2 REAR OUT
TO SYSCON (Page4-16) AL5V
TO SW/REG (Page4-18)
GND
SW5V
SW12V
AL5V
OPEN
IC1 AN3380FBP
IC2 MN3117 REF
TO FMA (Page4-13)
RF_AUDIO
DEMOD(L)
DEMOD(R)
LINE_IN(L)
LINE_IN(R)
FRONT(L)
FRONT(R)
LINE_OUT(L)
LINE_OUT(R)
NA_REC
NA_PB
TO A/C HEAD
FW301
P/R
A-E
CTL
T301
T302
TP339 OPEN A.ERASE
TO FE HEAD
FW302
FE
TO UPPER DRUM
CN1
EP CH1
EP CH2
SP CH1
SP CH2
FMA CH1
FMA CH2
TO FMA (Page4-14)
FMA_CH1
FMA_COM
FMA_CH2
IC101 LA7416
TO SYSCON (Page4-16)
CTL(+)
CTL(-)
GND
SP(L)
HEAD_SEL
ENV_COMP
A/M/S
VIDEO_ENV
D.FF
REC(H)
C.SYNC
COL_ROT
AV_CTL1
SSB_DATA
SSB_CLK
REC_ST(H)
PAL_EP_CTL
TO SYSCON (Page4-16)
EDS(H)
AV_CTL3
P.MUTE(L)
SYNC_DET(L)
PAL_DET
AV_CTL2
OSD_CS
S_CLK
S_DATA
N.REC(L)
FULL_E_ON(L)
A.MUTE(H)
V.PULSE
AV_CTL4
AV_CTL6
AV_CTL5
CCIR(L)
WF1
WF2
WF3
WF4
WF5
WF6
WF7
WF8
WF9
WF10
WF11
WF12
WF13
WF14
WF15
WF16
WF17
WF18
WF19

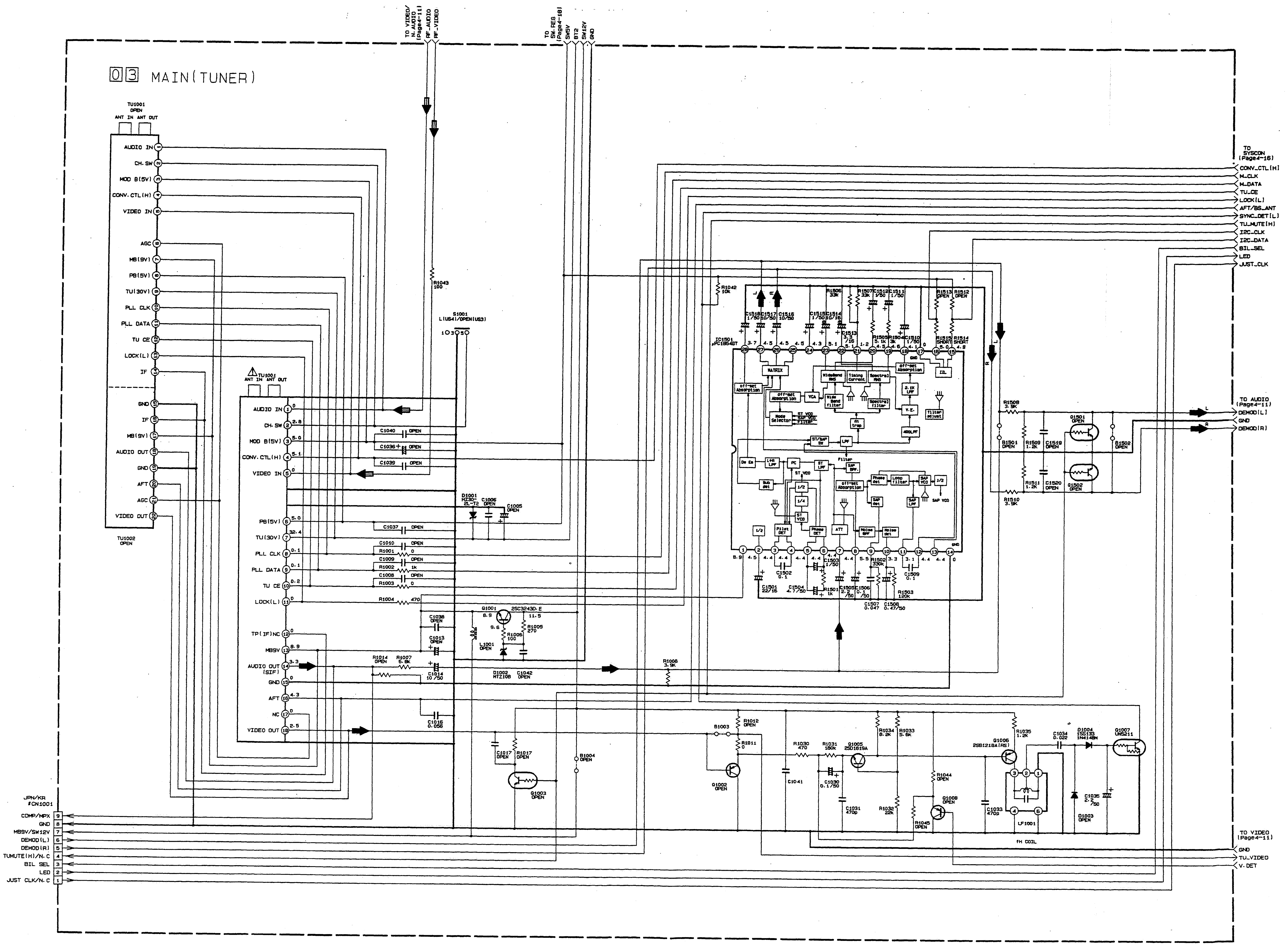
NOTE: For VIDEO, PRE/REC AND AUDIO waveforms, please refer to page4-23.

4.7 SYSTEM CONTROL SCHEMATIC DIAGRAM

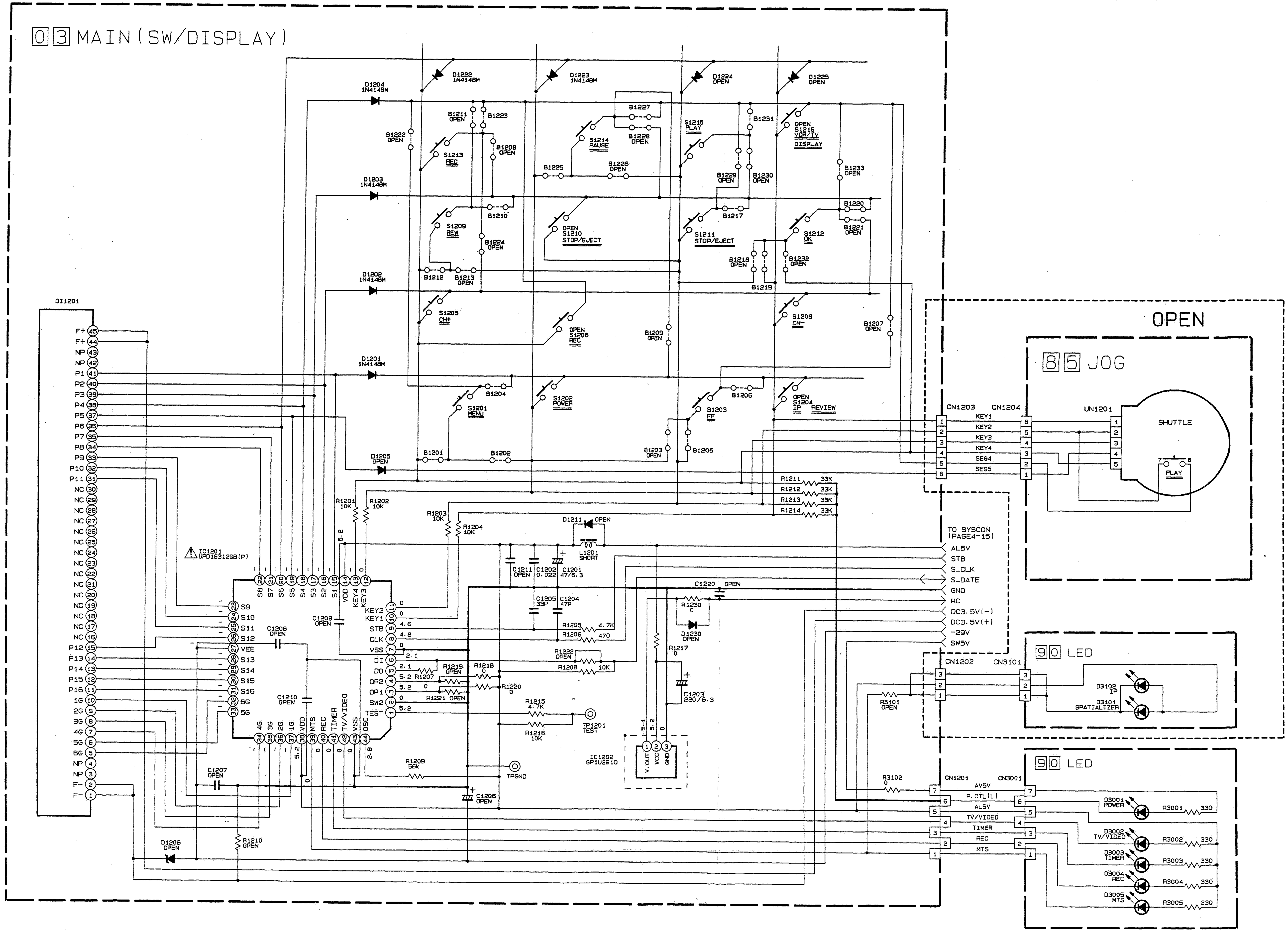

03 MAIN [SYSCON]
TO SW.REG (Page4-18)
AL12V
AL5.8V
45V
P.CTL(H)
SW12V
M12V
GND
SW5V
GND
DC3.5V(+)
DC3.5V(-)
-29V
TO LOADING MOTOR CN703
LDM2
LDM1
TO CAP.MDA CN701
CAP_FG
SW5V
CAP_REV(L)
CAP_CTL_V
M12V
GND(C)
NC
GND(M)
TO DRUM MDA CN704
GND
D.FG
M12V
D.PG
DRUM_CTL_V
TO SW/DISPLAY (Page4-22)
RC
STB
S_CLK
S_DATA
AL5V
GND
DC3.5V(+)
-29V
DC3.5V(-)
TO ROTARY ENCODER CN702
GND(C)
LSC
LSA
NC
LSB
TO REMOTE LOC CN705
REMOTE LOC
AL12V
GND
CN708
LED_RETURN
C.BOX_CTL
GND
PAUSE/COMP
OPEN
TO C.BOX
AV_CTL8
AL5V
GND
C.BOX_CTL
LED_RETURN
R.L.OUT
TO INTER FACE
BIT_IN
SSB_DATA
SSB_CLK
I2C_CLK
AFT/BS_ANT
AV_CTL8
AV_CTL2
AV_CTL1
AV_CTL5
I2C_DATA
SP(L)
IC703 TA7291S
IC701 OPEN
X701 6MHz PEV80567
IC702 OPEN
IC704 S-80728AN-Z
X702 32kHz QAX0304-001
TIMER CLOCK
S701 PESW0574 CAS.INS.SW
S702 PESW0589 REC.SAFE.SW
Q701 SIR-381SB3FK
Q706 LP4003B-001A START SENSOR
Q707 LP4003B-001A END SENSOR
PS701 SG-246 REEL SENSOR SUPPLY
PS702 SG-246 REEL SENSOR TAKE UP
PAL EP CTL
PAL DET/BIT IN
CAP CTL V
DRUM CTL V
TU FG
SP FG
AV CTL4
AV CTL5
AV CTL1
A/M/S
RC IN
PROTECT
TEST
SYNC DET
HEAD_SEL2
COL.ROT
ENV COMP
V.PULSE
REC ST(H)
AV CTL3
A.FF
EDS(H)/JUST CLK
REMOTE PAUSE/COMPU IN
HIFI REC ST(L)
D.FF
BUCK UP 5V
AV CTL6
NC
LMC3
CASS SW
GND
BACK UP
CTL VSS
CTL(-)
CTL(+)
CTL(+)SW
CTL AMP IN
AMPC
CTL AMP OUT
CLAMPR
CLAMPF
(VCC/2)
AMP VREF OUT
C.FG IN
D.FG IN
D.PG IN
AMP VCC
REC(H)
AV CTL2
HEAD SEL
OSD CS
SP(L)
CONV.CTL(H)
TU CE
LOCK(L)
TU CLK
TU DATA
AV CTL8
P.CTL
TU MUTE(H)
P.MUTE
TO FMA (Page4-13,14)
H.REC_ST(L)
A.FF
A.ENV/ND(L)
IND(L)
IND(R)
A.MUTE(H)
I2C_CLK
I2C_DATA
REC(H)
SP(L)
AV_CTL1
TO LITHIUM BATTERY CN706
BACK UP
GND
OPEN
TO TUNER (Page4-20)
LED
AFT/BS_ANT
CONV_CTL(H)
SYNC_DET(L)
TU_CE
LOCK(L)
M_CLK
M_DATA
TU_MUTE(H)
P.CTL(H)(OPEN)
I2C_CLK
I2C_DATA
BIL_SEL
JUST_CLK
TO VIDEO/N.AUDIO (Page4-11,12)
AL5V
A.MUTE(H)
N.REC(L)
FULL_E_ON(L)
VIDEO_ENV
SSB_CLK
SSB_DATA
S_DATA
S_CLK
C.SYNC
REC_ST(H)
CTL(-)
CTL(+)
OSD_CS
P.MUTE(L)
REC(H)
CCIR(L)
HEAD_SEL
PAL_DET
D.FF
EDS(H)
PAL_EP_CTL
V.PULSE
ENV_COMP
COL_ROT
AV_CTL3
AV_CTL6
AV_CTL4
A/M/S
AV_CTL2
AV_CTL1
AV_CTL5
SP(L)
SYNC_DET(L)
BEST(L)/TITLE_REC(H)
FRONT(L)/COMB_OFF(H)
CS2/CONVERT(L)/EDIT(L)
NTSC(L)/FULL_E_ON(L)/BS(L)
GAIN/AP_ON(L)/IP_ON(H)/EDIT(L)
WF1
WF2
WF3
WF4
WF5
A
B
C
D
E
F
G
H

NOTE : For SYSCON waveforms, please refer to page4-23.

4.9 TUNER SCHEMATIC DIAGRAM


03 MAIN(TUNER)
TO VIDEO/
N.AUDIO
(Page4-11)
RF_AUDIO
RF_VIDEO
TO
SW.REG
(Page4-18)
SW5V
BT2
SW12V
GND
TU1001
OPEN
ANT IN ANT OUT
AUDIO IN 1
CH.SW 2
MOD B(5V) 3
CONV.CTL(H) 4
VIDEO IN 5
AGC 6
MB(9V) 7
PB(5V) 8
TU(30V) 9
PLL CLK 10
PLL DATA 11
TU CE 12
LOCK(L) 13
IF 14
GND 15
IF 16
MB(9V) 17
AUDIO OUT 18
GND 19
AFT 20
AGC 21
VIDEO OUT 22
TU1002
OPEN
TU1001
ANT IN ANT OUT
AUDIO IN 1 0
CH.SW 2 2.8
MOD B(5V) 3 5.0
CONV.CTL(H) 4 5.1
VIDEO IN 5 0
PB(5V) 6 5.0
TU(30V) 7 32.4
PLL CLK 8 0.1
PLL DATA 9 0.1
TU CE 10 0.2
LOCK(L) 11 0
TP(IF)NC 12 0
MB9V 13 8.9
AUDIO OUT (SIF) 14 3.3
GND 15 0
AFT 16 4.3
NC 17 0
VIDEO OUT 18 2.5
S1001
L(US4)/OPEN(US3)
R1043
100
C1040 OPEN
C1036 OPEN
C1039 OPEN
C1037 OPEN
C1010 OPEN
R1001 0
C1009 OPEN
R1002 1k
C1008 OPEN
R1003 0
R1004 470
D1001
HZ30-2L-T2
C1006 OPEN
C1005 OPEN
C1038 OPEN
C1013 OPEN
C1014 10/50
C1016 0.056
R1014 OPEN
R1007 5.6K
Q1001 2SC3243D·E
8.9
11.5
9.6
R1006 100
R1005 270
L1001 OPEN
D1002 MTZ10B
C1042 OPEN
R1008 3.9K
C1017 OPEN
R1017 OPEN
Q1003 OPEN
B1004 OPEN
R1042 10k
IC1501
μPC1854GT
C1518 1/50
C1517 10/50
C1516 10/50
C1515 1/50
C1514 10/16
C1513 3.3/16
R1506 33k
R1507 33k
C1512 1/50
C1511 1/50
R1505 5.1k
R1504 3k
C1510 1/50
R1513 OPEN
R1512 OPEN
R1515 SHORT
R1514 SHORT
MATRIX
off-set Absorption
VCA
Wide Band RMS
Timing Current
Spectral RMS
Wide Band filter
Spectral filter
Mode Selector
ST VCO
SAP VCO
Filter
fh trap
2.1K LPF
V.E.
400LPF
filter adjust
IDL
ST/SAP SW
LPF
De Em
L+R LPF
PC
ST LPF
SAP BPF.
Sub det
1/2
1/4
ST VCO
Phase det
Loop filter
SAP VCO
Pilot DET
ATT
Noise BPF
Noise det
SAP det
SAP LPF
GND
C1501 22/16
C1502 0.1
C1504 4.7/50
C1503 1/50
R1501 1k
C1505 2.2/50
C1506 0.1/50
R1502 330k
C1507 0.047
C1508 0.47/50
R1503 120k
C1509 0.1
L
R
R1508 3.9K
B1501 OPEN
R1509 1.2K
C1519 OPEN
Q1501 OPEN
B1502 OPEN
R1511 1.2K
C1520 OPEN
Q1502 OPEN
R1510 3.9K
TO AUDIO
(Page4-11)
DEMOD(L)
GND
DEMOD(R)
TO
SYSCON
(Page4-16)
CONV_CTL(H)
M_CLK
M_DATA
TU_CE
LOCK(L)
AFT/BS_ANT
SYNC_DET(L)
TU_MUTE(H)
I2C_CLK
I2C_DATA
BIL_SEL
LED
JUST_CLK
B1003
R1012 OPEN
R1011 0
Q1002 OPEN
C1041
R1030 470
R1031 180k
C1030 0.1/50
C1031 470p
Q1005 2SD1819A
R1034 8.2k
R1033 5.6k
R1032 22k
R1044 OPEN
R1045 OPEN
Q1008 OPEN
C1033 470p
Q1006 2SB1218A(RS)
R1035 1.2k
LF1001
fH COIL
C1034 0.022
D1004 1SS133 1N4148M
D1003 OPEN
C1035 2.2/50
Q1007 UN5211
TO VIDEO
(Page4-11)
GND
TU_VIDEO
V.DET
JPN/KR
#CN1001
COMP/MPX 9
GND 8
MB9V/SW12V 7
DEMOD(L) 6
DEMOD(R) 5
TUMUTE(H)/N.C 4
BIL SEL 3
LED 2
JUST CLK/N.C 1

4.10 SW/DISPLAY SCHEMATIC DIAGRAM



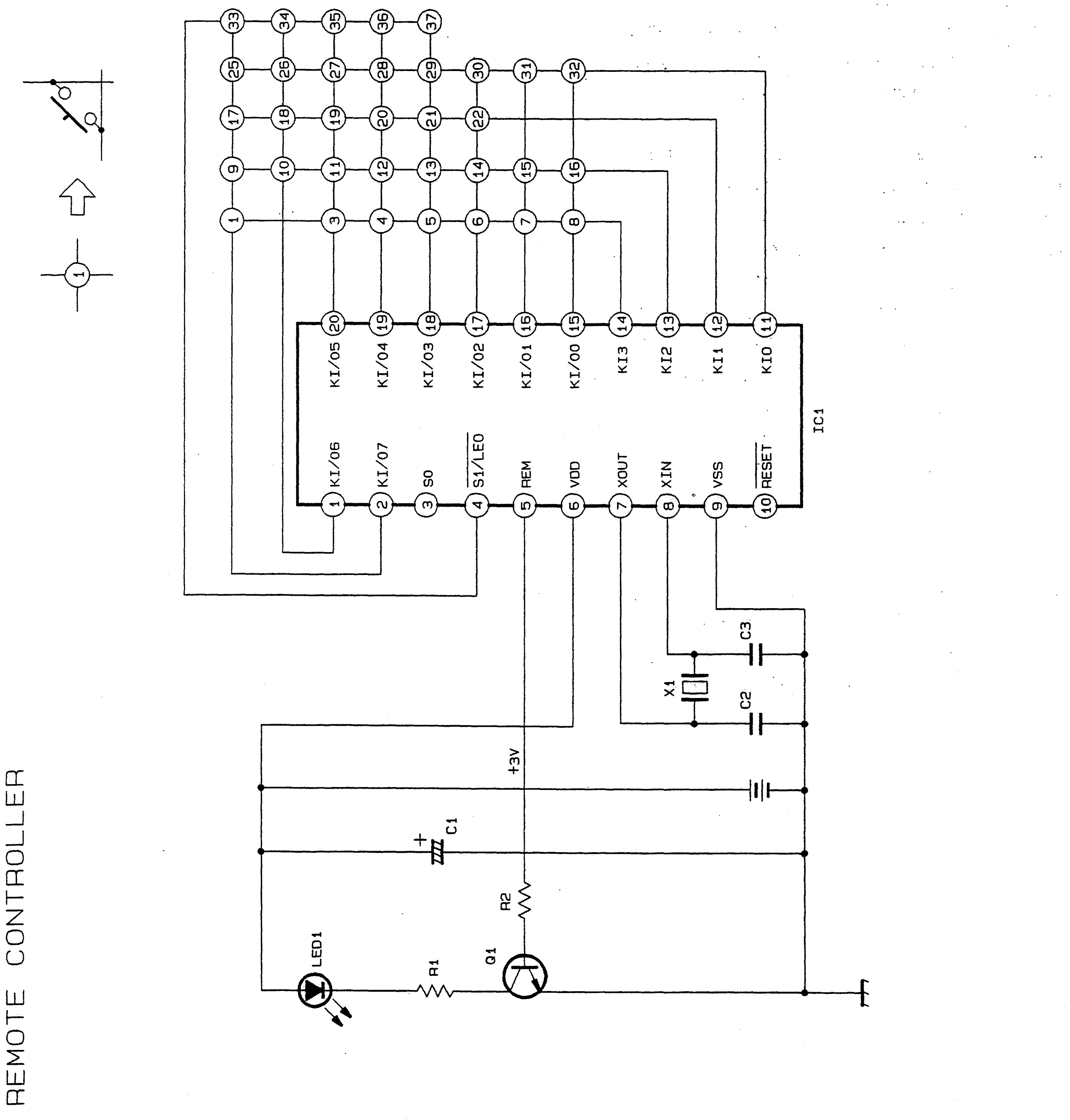
03 MAIN (SW/DISPLAY)
DI1201
IC1201 UPD16312GB(P)
D1201 1N4148M
D1202 1N4148M
D1203 1N4148M
D1204 1N4148M
D1205 OPEN
D1206 OPEN
D1211 OPEN
D1222 1N4148M
D1223 1N4148M
D1224 OPEN
D1225 OPEN
S1201 MENU
S1202 POWER
S1203 FF
S1204 IP REVIEW
S1205 CH+
S1206 REC
S1208 CH−
S1209 REW
S1210 STOP/EJECT
S1211 STOP/EJECT
S1212 OK
S1213 REC
S1214 PAUSE
S1215 PLAY
S1216 VCR/TV DISPLAY
R1201 10K
R1202 10K
R1203 10K
R1204 10K
R1211 33K
R1212 33K
R1213 33K
R1214 33K
R1205 4.7K
R1206 470
R1208 10K
R1209 56K
R1215 4.7K
R1216 10K
R1210 OPEN
R1230 0
R1217 0
C1201 47/6.3
C1202 0.022
C1203 220/6.3
C1204 47P
C1205 33P
C1206 OPEN
C1207 OPEN
C1208 OPEN
C1209 OPEN
C1210 OPEN
C1211 OPEN
C1220 OPEN
L1201 SHORT
IC1202 GP1U291Q
TP1201 TEST
TPGND
TO SYSCON (PAGE4-15)
AL5V
STB
S_CLK
S_DATE
GND
RC
DC3.5V(−)
DC3.5V(+)
−29V
SW5V
OPEN
85 JOG
CN1203
CN1204
UN1201
SHUTTLE
PLAY
KEY1
KEY2
KEY3
KEY4
SEG4
SEG5
90 LED
CN1202
CN3101
D3102 IP
D3101 SPATIALIZER
R3101 OPEN
R3102 0
CN1201
CN3001
AV5V
P.CTL(L)
AL5V
TV/VIDEO
TIMER
REC
MTS
D3001 POWER
D3002 TV/VIDEO
D3003 TIMER
D3004 REC
D3005 MTS
R3001 330
R3002 330
R3003 330
R3004 330
R3005 330
A
B
C
D
E
F
G
H

4.13 REMOTE CONTROL SCHEMATIC DIAGRAM AND LED CIRCUIT BOARD

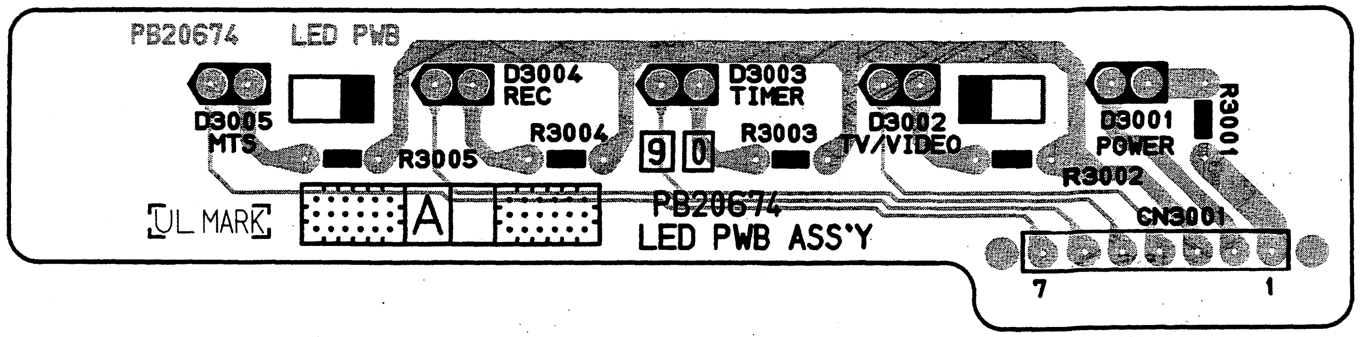
NOTES:
1.All parts shown in this schematic are critical for safety.
2.This schematic is only for reference.
Avoid replacing individual parts.
Replace the entire unit only.

Key No.	Key Name
1	TV
3	TV/VCR
4	TIMER
5	ADD
6	SP/EP
7	REW
8	REC
9	1
10	4
11	7
12	CANCEL/C.RESET
13	TV VOL+
14	TV VOL-
15	PLAY
16	STOP
17	2
18	5
19	8 DAILY
20	0 AUX
21	CH
22	CH
25	3
26	6
27	9 WEEKLY
28	ENTER/OSD
29	MENU
30	OK
31	FF
32	PAUSE
33	DISPLAY
34	SEARCH <<
35	SEARCH >>
36	SKIP SEARCH
37	POWER
8+15	REC PLAY
8+32	REC PAUSE
1+3	TV/VCR
1+13	TV VOL+
1+14	TV VOL-
1+21	TV CH
1+22	TV CH
1+37	TV POWER

BZ013296-01


REMOTE CONTROLLER
IC1
KI/05
KI/04
KI/03
KI/02
KI/01
KI/00
KI3
KI2
KI1
KI0
KI/06
KI/07
S0
S1/LED
REM
VDD
XOUT
XIN
VSS
RESET
C3
C2
X1
+3V
C1
R2
Q1
R1
LED1

— LED —

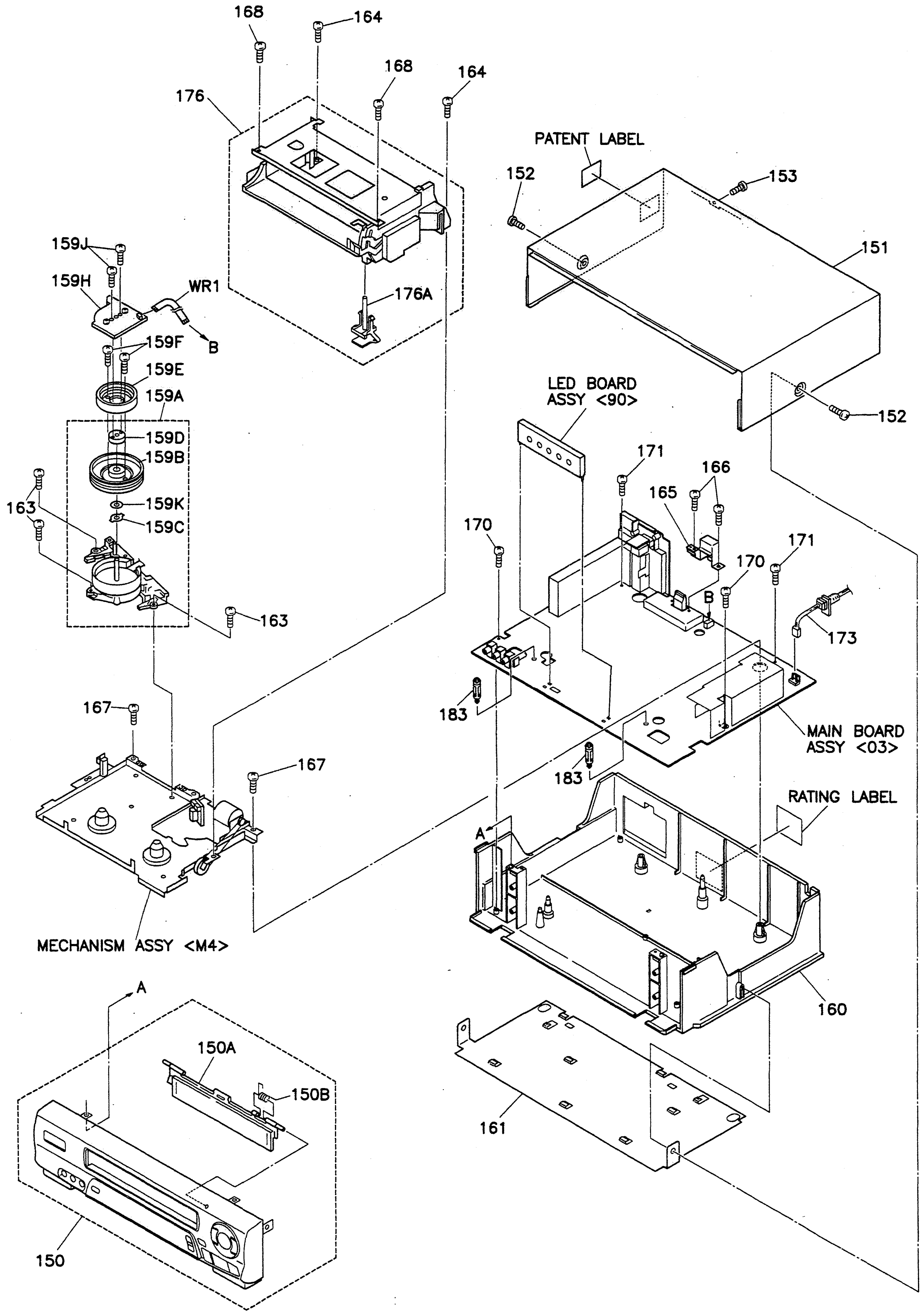

PB20674 LED PWB
D3005 MTS
D3004 REC
R3005
R3004
D3003 TIMER
R3003
9 0
D3002 TV/VIDEO
D3001 POWER
R3001
R3002
UL MARK
A
PB20674
LED PWB ASS'Y
CN3001
7
1

SECTION 5
PARTS LIST

5.2 CABINET AND CHASSIS ASSEMBLY <M2>

BEWARE OF BOGUS PARTS

Parts that do not meet specifications may cause trouble in regard to safety and performance. We recommend that genuine JVC parts be used.


168
164
168
164
176
176A
PATENT LABEL
152
153
151
159J
159H
WR1
B
159F
159E
159A
159D
159B
159K
159C
163
163
LED BOARD ASSY <90>
171
166
165
170
170
171
B
173
183
183
MAIN BOARD ASSY <03>
167
167
RATING LABEL
A
MECHANISM ASSY <M4>
160
A
150A
150B
161
150

CABINET AND CHASSIS ASSEMBLY <M2>

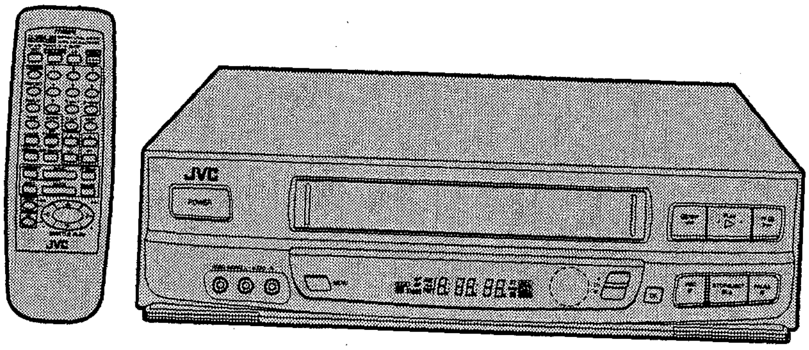
	150	PQ11895R-10	FRONT PANEL ASSEMBLY
	150A	PQ21884-28	CASSETTE DOOR
	150B	PQ46448	TORSION SPRING
⚠	151	PQ11898-3-7	TOP COVER
	152	SDSF3010M	SCREW,X2 TOP COVER(SIDE)
	153	SDSF3010M	SCREW,TOP COVER(REAR)
	159A	LP20053-001A	DRUM SUB ASSEMBLY
	159B	LP20030-001A	UPPER DRUM ASSEMBLY
	159C	LP40025-001A	BRUSH ASSEMBLY
	159D	LP40028-001A	COLLAR ASSEMBLY
	159E	QAR0002-001	ROTOR ASSEMBLY
	159F	SPSP3006Z	SCREW,X2
	159G	PDM4439	CAP
	159H	QAR0003-001	STATOR ASSEMBLY
	159J	SPSP2606Z	SCREW,X2
	159K	PDM4444-19-2	WASHER
⚠	160	PQ21881-1-10	BOTTOM CHASSIS
⚠	161	PQ11899-1-4	BOTTOM COVER
	163	SPST2608Z	SCREW,X3 DRUM
	164	SPST2606Z	SCREW,X2 CASS HOUS ASSY
	165	PQ35385-1-1	SHIELD COVER,PRE/REC
	166	SDST2606Z	SCREW,X2 PRE/REC
	167	SDSF4012Z	SCREW,X2 MECH
	168	SDSF3010Z	SCREW,X2 CASS HOUS ASSEMBLY
	170	SDSF3010Z	SCREW,X2 MAIN
	171	DPSF3010Z	SCREW,X2 MAIN
⚠	173	QMP14K0-170	POWER CORD
	176	PUS29724E	CASSETTE HOUSING ASSEMBLY
	176A	PQ46359-1-1	CASSETTE SWITCH PIN
	183	PEME0947-01-01	SPACER,X2 MECH
	WR1	PW30803-0524	WIRE,DRUM MDA

JVC

SERVICE MANUAL

VIDEO CASSETTE RECORDER

HR-A63U/J640U/J643U



Hi-Fi

VHS

SPECIFICATIONS *(The specifications shown pertain specifically to the model HR-J643U)*

GENERAL

Power requirement : AC 120 V∿, 60 Hz
Power consumption : 21 W (HR-J643U)
: 19 W (HR-J443U)
Temperature
Operating : 5°C to 40°C (41°F to 104°F)
Storage : –20°C to 60°C (–4°F to140°F)
Operating position : Horizontal only
Dimensions (W x H x D) : 360 x 94 x 276 mm
(14-3/16" x 3-3/4" x 10 -7/8")
Weight : 3.4 kg (7.5 lbs)
Format : VHS NTSC standard
Maximum recording time
SP : 210 min. with ST-210 video cassette
EP : 630 min. with ST-210 video cassette

VIDEO/AUDIO

Signal system : NTSC-type color signal and EIA monochrome signal, 525 lines/60 fields
Recording/Playback system : DA-4 (Double Azimuth) head helical scan system
Signal-to-noise ratio : 45 dB
Horizontal resolution : 240 lines
Frequency range
Normal audio : 70 Hz to 10,000 Hz
Hi-Fi audio (HR-J643U Only) : 20 Hz to 20,000 Hz
Input/Output : RCA connectors (IN x 1, OUT x 1)

TUNER

Tuning system : Frequency-synthesized tuner
Channel coverage
VHF : Channels 2–13
UHF : Channels 14–69
CATV : 113 Channels
RF output : Channel 3 or 4 (switchable; preset to Channel 3 when shipped) 75 ohms, unbalanced

TIMER

Clock reference : Quartz
Program capacity : 1-year programmable timer/ 8 programs
Memory backup time : Approx. 10 min.

ACCESSORIES

Provided accessories : RF cable (F-type), Infrared remote control unit, "AA" battery x 2

Specifications shown are for SP mode unless otherwise specified.
E. & O.E. Design and specifications subject to change without notice.

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The following table lists the differing points between Models (HR-A63U, HR-J640U/U(C) and HR-J643U/U(C) in this series.

	HR-A63U	HR-J640U/U(C)	HR-J643U/U(C)
BEST SYSTEM	AUTO PICTURE	AUTO PICTURE	ACTIVE VICEO CAL.
CHILD LOCK	×	×	○
INSTANT REVIEW	×	○	○
COUNTER MEMORY	×	○	○
REMOTE CONTROL (DBS MBR)	×	○	○

NOTE : × NOT USED ○ USED

Important Safety Precautions

Prior to shipment from the factory, JVC products are strictly inspected to conform with the recognized product safety and electrical codes of the countries in which they are to be sold. However, in order to maintain such compliance, it is equally important to implement the following precautions when a set is being serviced.

● Precautions during Servicing

1. Locations requiring special caution are denoted by labels and inscriptions on the cabinet, chassis and certain parts of the product. When performing service, be sure to read and comply with these and other cautionary notices appearing in the operation and service manuals.

2. Parts identified by the ⚠ symbol and shaded (▨) parts are critical for safety.
   Replace only with specified part numbers.
   Note: **Parts in this category also include those specified to comply with X-ray emission standards for products using cathode ray tubes and those specified for compliance with various regulations regarding spurious radiation emission.**

3. Fuse replacement caution notice.
   Caution for continued protection against fire hazard.
   Replace only with same type and rated fuse(s) as specified.

4. Use specified internal wiring. Note especially:
   1) Wires covered with PVC tubing
   2) Double insulated wires
   3) High voltage leads

5. Use specified insulating materials for hazardous live parts. Note especially:
   1) Insulation Tape
   2) PVC tubing
   3) Spacers
   4) Insulation sheets for transistors
   5) Barrier

6. When replacing AC primary side components (transformers, power cords, noise blocking capacitors, etc.) wrap ends of wires securely about the terminals before soldering.

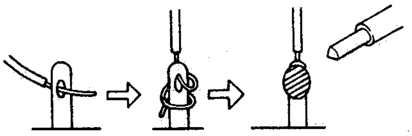


Fig. 1

7. Observe that wires do not contact heat producing parts (heatsinks, oxide metal film resistors, fusible resistors, etc.)

8. Check that replaced wires do not contact sharp edged or pointed parts.

9. When a power cord has been replaced, check that 10–15 kg of force in any direction will not loosen it.

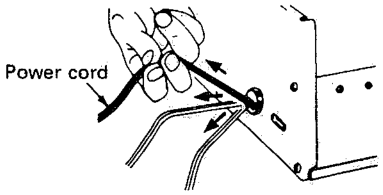


Fig. 2

10. Also check areas surrounding repaired locations.

11. Products using cathode ray tubes (CRTs)
    In regard to such products, the cathode ray tubes themselves, the high voltage circuits, and related circuits are specified for compliance with recognized codes pertaining to X-ray emission. Consequently, when servicing these products, replace the cathode ray tubes and other parts with only the specified parts. Under no circumstances attempt to modify these circuits. Unauthorized modification can increase the high voltage value and cause X-ray emission from the cathode ray tube.

12. Crimp type wire connector
    In such cases as when replacing the power transformer in sets where the connections between the power cord and power transformer primary lead wires are performed using crimp type connectors, if replacing the connectors is unavoidable, in order to prevent safety hazards, perform carefully and precisely according to the following steps.
    1) **Connector part number** : E03830-001
    2) **Required tool** : Connector crimping tool of the proper type which will not damage insulated parts.
    3) **Replacement procedure**
       (1) Remove the old connector by cutting the wires at a point close to the connector.
       Important : Do not reuse a connector (discard it).

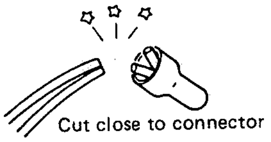


Fig. 3

(2) Strip about 15 mm of the insulation from the ends of the wires. If the wires are stranded, twist the strands to avoid frayed conductors.

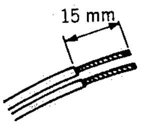


Fig. 4

(3) Align the lengths of the wires to be connected. Insert the wires fully into the connector.

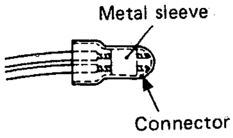


Fig. 5

(4) As shown in Fig. 6, use the crimping tool to crimp the metal sleeve at the center position. Be sure to crimp fully to the complete closure of the tool.

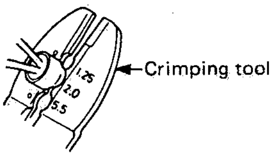


Fig. 6

(5) Check the four points noted in Fig. 7.

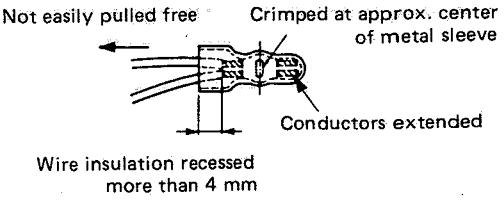

Not easily pulled free
Crimped at approx. center of metal sleeve
Conductors extended
Wire insulation recessed more than 4 mm

Fig. 7

● Safety Check after Servicing

Examine the area surrounding the repaired location for damage or deterioration. Observe that screws, parts and wires have been returned to original positions, Afterwards, perform the following tests and confirm the specified values in order to verify compliance with safety standards.

1. **Insulation resistance test**
   Confirm the specified insulation resistance or greater between power cord plug prongs and externally exposed parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.). See table 1 below.

2. **Dielectric strength test**
   Confirm specified dielectric strength or greater between power cord plug prongs and exposed accessible parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.). See table 1 below.

3. **Clearance distance**
   When replacing primary circuit components, confirm specified clearance distance (d), (d') between soldered terminals, and between terminals and surrounding metallic parts. See table 1 below.

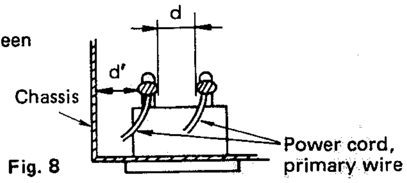


Fig. 8

4. **Leakage current test**
   Confirm specified or lower leakage current between earth ground/power cord plug prongs and externally exposed accessible parts (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.).
   Measuring Method: (Power ON)
   Insert load Z between earth ground/power cord plug prongs and externally exposed accessible parts. Use an AC voltmeter to measure across both terminals of load Z. See figure 9 and following table 2.

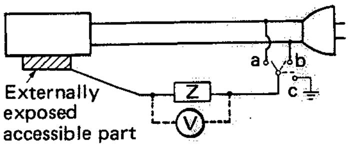


Fig. 9

5. **Grounding (Class I model only)**
   Confirm specified or lower grounding impedance between earth pin in AC inlet and externally exposed accessible parts (Video in, Video out, Audio in, Audio out or Fixing screw etc.).
   Measuring Method:
   Connect milli ohm meter between earth pin in AC inlet and exposed accessible parts. See figure 10 and grounding specifications.

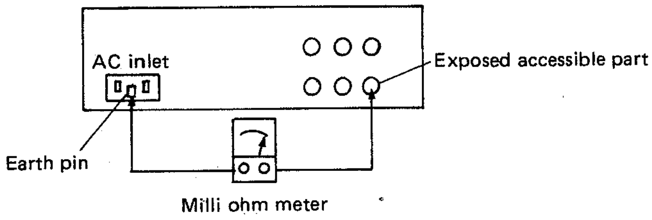


Fig. 10

Grounding Specifications

Region	Grounding Impedance (Z)
USA & Canada	Z ≦ 0.1 ohm
Europe & Australia	Z ≦ 0.5 ohm

AC Line Voltage	Region	Insulation Resistance (R)	Dielectric Strength	Clearance Distance (d), (d')
100 V	Japan	R ≧ 1 MΩ/500 V DC	AC 1 kV 1 minute	d, d' ≧ 3 mm
100 to 240 V			AC 1.5 kV 1 minute	d, d' ≧ 4 mm
110 to 130 V	USA & Canada	–	AC 1 kV 1 minute	d, d' ≧ 3.2 mm
110 to 130 V 200 to 240 V	Europe & Australia	R ≧ 10 MΩ /500 V DC	AC 3 kV 1 minute (Class II) AC 1.5 kV 1 minute (Class I)	d ≧ 4 mm d' ≧ 8 mm (Power cord) d' ≧ 6 mm (Primary wire)

Table 1 Specifications for each region

AC Line Voltage	Region	Load Z	Leakage Current (i)	a, b, c
100 V	Japan	1 kΩ	i ≦ 1 mA rms	Exposed accessible parts
110 to 130 V	USA & Canada	0.15 µF 1.5 kΩ	i ≦ 0.5 mA rms	Exposed accessible parts
110 to 130 V 220 to 240 V	Europe & Australia	2 kΩ	i ≦ 0.7 mA peak i ≦ 2 mA dc	Antenna earth terminals
		50 kΩ	i ≦ 0.7 mA peak i ≦ 2 mA dc	Other terminals

Table 2 Leakage current specifications for each region

Note: These tables are unofficial and for reference only. Be sure to confirm the precise values for your particular country and locality.

INSTRUCTIONS

Dear Customer,
Thank you for purchasing the JVC VHS video cassette recorder. Before use, please read the safety information and precautions contained in the following pages to ensure safe use of your new VCR.

CAUTIONS

CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN

CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK.
DO NOT REMOVE COVER (OR BACK).
NO USER-SERVICEABLE PARTS INSIDE.
REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

WARNING:
TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS UNIT TO RAIN OR MOISTURE.

CAUTION:
This video cassette recorder should be used with AC 120V∿, 60Hz only.
To prevent electric shocks and fire hazards, DO NOT use any other power source.

CAUTION:
TO PREVENT ELECTRIC SHOCK, MATCH WIDE BLADE OF PLUG TO WIDE SLOT, FULLY INSERT.

ATTENTION:
POUR ÉVITER LES CHOCS ÉLECTRIQUES, INTRODUIRE LA LAME LA PLUS LARGE DE LA FICHE DANS LA BORNE CORRESPONDANTE DE LA PRISE ET POUSSER JUSQU'AU FOND.

Note to CATV system installer:
This reminder is provided to call the CATV system installer's attention to Article 820-40 of the NEC that provides guidelines for proper grounding and, in particular, specifies that the cable ground shall be connected to the grounding system of the building, as close to the point of cable entry as practical.

CAUTION:
Changes or modifications not approved by JVC could void user's authority to operate the equipment.

Failure to heed the following precautions may result in damage to the VCR, remote control or video cassette.

1. **DO NOT place the VCR . . .**
   ... in an environment prone to extreme temperatures or humidity.
   ... in direct sunlight.
   ... in a dusty environment.
   ... in an environment where strong magnetic fields are generated.
   ... on a surface that is unstable or subject to vibration.
2. **DO NOT block the VCR's ventilation openings.**
3. **DO NOT place heavy objects on the VCR or remote control.**
4. **DO NOT place anything which might spill on top of the VCR or remote control.**
5. **AVOID violent shocks to the VCR during transport.**

**MOISTURE CONDENSATION

Moisture in the air will condense on the VCR when you move it from a cold place to a warm place, or under extremely humid conditions—just as water droplets form on the surface of a glass filled with cold liquid. Moisture condensation on the head drum will cause damage to the tape. In conditions where condensation may occur, keep the VCR's power turned on for a few hours to let the moisture dry before inserting a tape.

**ABOUT HEAD CLEANING

Accumulation of dirt and other particles on the video heads may cause the playback picture to become blurred or interrupted. Be sure to contact your nearest JVC dealer if such troubles occur.

DSS™ is an official trademark of DIRECTV, Inc., a unit of GM Hughes Electronics. PRIMESTAR is a registered service mark of Primestar Partners, L.P. DISH Network™ is a trademark of Echostar Communications Corporation.

VHS HQ

- Cassettes marked "VHS" (or "S-VHS") can be used with this video cassette recorder. However, only "VHS" recordings can be played back in this model.
- HQ VHS is compatible with existing VHS equipment.

IMPORTANT PRODUCT SAFETY INSTRUCTIONS

Electrical energy can perform many useful functions. But improper use can result in potential electrical shock or fire hazards. This product has been engineered and manufactured to assure your personal safety. In order not to defeat the built-in safeguards, observe the following basic rules for its installation, use and servicing.

ATTENTION:

Follow and obey all warnings and instructions marked on your product and its operating instructions. For your safety, please read all the safety and operating instructions before you operate this product and keep this booklet for future reference.

INSTALLATION

1. Grounding or Polarization

(A) Your product may be equipped with a polarized alternating-current line plug (a plug having one blade wider than the other). This plug will fit into the power outlet only one way. This is a safety feature.
If you are unable to insert the plug fully into the outlet, try reversing the plug. If the plug should still fail to fit, contact your electrician to replace your obsolete outlet. Do not defeat the safety purpose of the polarized plug.

(B) Your product may be equipped with a 3-wire grounding-type plug, a plug having a third (grounding) pin. This plug will only fit into a grounding-type power outlet. This is a safety feature.
If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat the safety purpose of the grounding-type plug.

2. Power Sources

Operate your product only from the type of power source indicated on the marking label. If you are not sure of the type of power supply to your home, consult your product dealer or local power company. If your product is intended to operate from battery power, or other sources, refer to the operating instructions.

3. Overloading

Do not overload wall outlets, extension cords, or integral convenience receptacles as this can result in a risk of fire or electric shock.

4. Power Cord Protection

Power supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit from the product.

5. Ventilation

Slots and openings in the cabinet are provided for ventilation. To ensure reliable operation of the product and to protect it from overheating, these openings must not be blocked or covered.

- Do not block the openings by placing the product on a bed, sofa, rug or other similar surface.
- Do not place the product in a built-in installation such as a bookcase or rack unless proper ventilation is provided or the manufacturer's instructions have been adhered to.

6. Wall or Ceiling Mounting

The product should be mounted to a wall or ceiling only as recommended by the manufacturer.

ANTENNA INSTALLATION INSTRUCTIONS

1. Outdoor Antenna Grounding

If an outside antenna or cable system is connected to the product, be sure the antenna or cable system is grounded so as to provide some protection against voltage surges and built-up static charges. Article 810 of the National Electrical Code, ANSI/NFPA 70, provides information with regard to proper grounding of the mast and supporting structure, grounding of the lead-in wire to an antenna discharge unit, size of grounding connectors, location of antenna discharge unit, connection to grounding electrodes, and requirements for the grounding electrode.

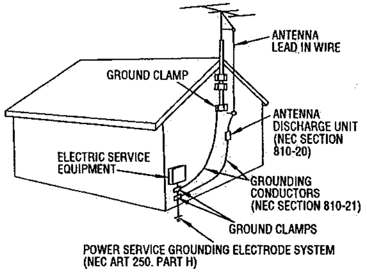
2. Lightning

For added protection for this product during a lightning storm, or when it is left unattended and unused for long periods of time, unplug it from the wall outlet and disconnect the antenna or cable system. This will prevent damage to the product due to lightning and power-line surges.

3. Power Lines

An outside antenna system should not be located in the vicinity of overhead power lines or other electric light or power circuits, or where it can fall into such power lines or circuits. When installing an outside antenna system, extreme care should be taken to keep from touching such power lines or circuits as contact with them might be fatal.

EXAMPLE OF ANTENNA GROUNDING AS PER NATIONAL ELECTRICAL CODE, ANSI/NFPA 70


ANTENNA LEAD IN WIRE
GROUND CLAMP
ANTENNA DISCHARGE UNIT (NEC SECTION 810-20)
ELECTRIC SERVICE EQUIPMENT
GROUNDING CONDUCTORS (NEC SECTION 810-21)
GROUND CLAMPS
POWER SERVICE GROUNDING ELECTRODE SYSTEM (NEC ART 250. PART H)

NEC – NATIONAL ELECTRICAL CODE

USE

1. Accessories

To avoid personal injury:

- Do not place this product on an unstable cart, stand, tripod, bracket, or table. It may fall, causing serious injury to a child or adult, and serious damage to the product.
- Use only with a cart, stand, tripod, bracket, or table recommended by the manufacturer or sold with the product.
- Use a mounting accessory recommended by the manufacturer and follow the manufacturer's instructions for any mounting of the product.
- Do not try to roll a cart with small casters across thresholds or deep-pile carpets.

2. Product and Cart Combination

A product and cart combination should be moved with care. Quick stops, excessive force, and uneven surfaces may cause the product and cart combination to overturn.

PORTABLE CART WARNING
(Symbol provided by RETAC)

3. Water and Moisture

Do not use this product near water—for example, near a bath tub, wash bowl, kitchen sink or laundry tub, in a wet basement, or near a swimming pool and the like.

4. Object and Liquid Entry

Never push objects of any kind into this product through openings as they may touch dangerous voltage points or short-out parts that could result in a fire or electric shock. Never spill liquid of any kind on the product.

5. Attachments

Do not use attachments not recommended by the manufacturer of this product as they may cause hazards.

6. Cleaning

Unplug this product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.

7. Heat

The product should be situated away from heat sources such as radiators, heat registers, stoves, or other products (including amplifiers) that produce heat.

SERVICING

1. Servicing

If your product is not operating correctly or exhibits a marked change in performance and you are unable to restore normal operation by following the detailed procedure in its operating instructions, do not attempt to service it yourself as opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing to qualified service personnel.

2. Damage Requiring Service

Unplug this product from the wall outlet and refer servicing to qualified service personnel under the following conditions:

a. When the power supply cord or plug is damaged.
b. If liquid has been spilled, or objects have fallen into the product.
c. If the product has been exposed to rain or water.
d. If the product does not operate normally by following the operating instructions. Adjust only those controls that are covered by the operating instructions as an improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the product to its normal operation.
e. If the product has been dropped or damaged in any way.
f. When the product exhibits a distinct change in performance—this indicates a need for service.

3. Replacement Parts

When replacement parts are required, be sure the service technician has used replacement parts specified by the manufacturer or have the same characteristics as the original part. Unauthorized substitutions may result in fire, electric shock or other hazards.

4. Safety Check

Upon completion of any service or repairs to this product, ask the service technician to perform safety checks to determine that the product is in safe operating condition.

HOW TO USE THIS INSTRUCTION MANUAL

- All major sections and subsections are listed in the Table Of Contents on page 5. Use this when searching for information on a specific procedure or feature.
- The Index on pages 41–44 lists frequently-used terms, and the number of the page on which they are used or explained in the manual. This section also illustrates the controls and connections on the front and rear panel, the front display panel and the remote control.
- The ☞ mark signals a reference to another page for instructions or related information.
- Operation buttons necessary for the various procedures are clearly indicated through the use of illustrations at the beginning of each major section.

BEFORE YOU INSTALL YOUR NEW VCR . . .

. . . please read the sections/literature listed below.

- "Cautions" on page 2
- "Important Products Safety Instructions" on the previous pages

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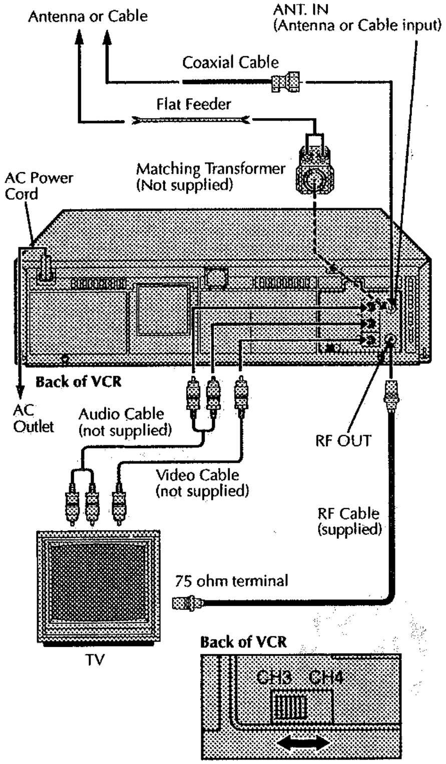
Basic Connections



NOTES:

- *The VCR channel is the channel on the TV which will display the audio and video signals from the VCR. The VCR's CH3-CH4 switch, on the back of the VCR, sets the VCR channel to CH3 or CH4.*
- *The CH3–CH4 switch is preset to the CH3 position.*
  Set to CH4 if CH3 is used for broadcasting in your area and set the channel on the TV to correspond to the VCR's CH3–CH4 switch setting.
- *If RF connection to TV is used, when switching from VCR to TV mode and from TV to VCR it may be necessary to issue a CH UP and then CH DOWN on TV to obtain a good quality picture.*
- *Even if you are using AV cables to connect your VCR to your TV, you must also connect it using the RF cable. This will ensure that you can record one show while watching another (☞ pg. 26).*
- *For full identification of the VCR's rear panel, refer to the Index (REAR VIEW ☞ pg. 43).*

1

CHECK CONTENTS

Make sure the package contains all of the accessories listed in "SPECIFICATIONS" (☞ pg. 45).

2

SITUATE VCR

Place the VCR on a stable, horizontal surface.

3

CONNECT VCR TO TV

The connection method you use depends on the type of TV you have.

RF Connection

- *To Connect To A TV With NO AV Input Terminals . . .*
  - **a–** Disconnect the TV antenna from the TV.
  - **b–** Connect the TV antenna cable to the ANT. IN jack on the rear of the VCR.
  - **c–** Connect the supplied RF cable between the RF OUT jack on the rear of the VCR and the TV's antenna terminal. Set TV on CH3 or CH4 corresponding to the CH3 – CH4 switch setting on the back of the VCR.

AV Connection

- *To Connect To A TV With AV Input Terminals . . .*
  - **a–** Connect the antenna, VCR and TV as shown in the illustration.
  - **b–** Connect an Audio/Video Cable between the AUDIO OUT and VIDEO OUT jacks on the rear of the VCR and the AV IN jacks on the TV. Set your TV in video input mode or A/V input mode. Refer to the TV Instruction Manual.

For HR-J443U Owners:
If your TV has AUDIO IN L and R connectors, connect the VCR to the L connector.

4

CONNECT VCR TO POWER SOURCE

Connect the power plug to an AC outlet.

- The clock and tuner channels will automatically be set when the antenna is connected and when the AC is first connected to the VCR (☞ pg. 7).
  (If "Auto" or "CH" is displayed on the front display panel before the VCR is powered on, the clock and tuner channels are being set automatically. Wait for the time to be displayed on the front display panel before powering on the VCR.)

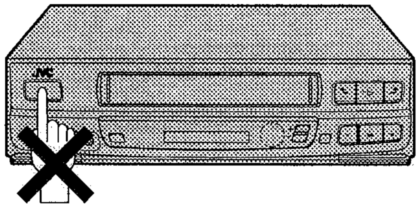
5

FINAL PREPARATION FOR USE

Power on the VCR and select the VCR channel (3 or 4) by setting the switch on the rear of the VCR as shown in the illustration.
You can now perform simple playback (☞ pg. 15) or simple recording (☞ pg. 16).

Plug & Play

Auto Clock Set/Auto Tuner Set



IMPORTANT

- Don't press any buttons on the VCR or remote while Plug & Play is in progress.
- If you perform Plug & Play successfully, there's no need to perform the Clock (☞ pg. 9) and Tuner (☞ pg. 12) procedures. If, however, you want to add or delete channels, refer to "Add Or Delete A Channel" on page 14.

ATTENTION CABLE BOX SUBSCRIBERS

If you perform the Plug & Play procedure . . .

- Select the PBS channel on your cable box before plugging your VCR's power plug into the AC outlet. (If you have more than one PBS channel, you may have to select an alternative PBS channel if Plug & Play is not successful.)
- If there is no PBS channel in your area, perform the Manual Clock Set procedure (☞ pg. 11).
- For automatic clock adjustment to take place the VCR's power must be off and the cable box must be set to the PBS channel at clock adjustment times.
- If you perform Plug & Play successfully, D.S.T. will be set to "AUTO". At the D.S.T. adjustment time (☞ pg. 11), your VCR's power must be off and your cable box must be set to the host PBS channel in your area for the D.S.T. adjustment to take place. If the clock is not set correctly, change the D.S.T. setting to "ON" or "OFF. See step **9** of Semi-Auto procedure (☞ pg. 10) or step **6** of Manual procedure (☞ pg. 11).

NOTE:

If the memory backup fails, because of a power outage or because the AC was removed from the VCR, Plug & Play will be performed when power is restored to the VCR.

The Plug & Play function sets the clock and tuner channels automatically when power is first connected to the VCR. The antenna cable must be connected for the Plug & Play function.

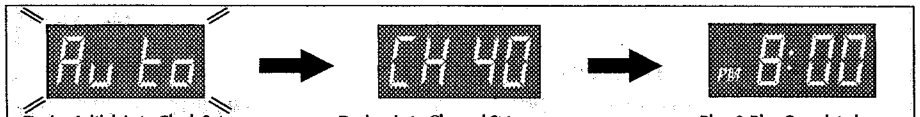
The time and date can be set automatically from clock setting data that is transmitted by one of the regular TV broadcast channels. We call this TV channel the "Host Channel" and it is a PBS channel in your area.

1

PLUG & PLAY SETUP

Connect the antenna cable to the VCR (☞ pg. 6). Then connect the VCR's power plug to an AC outlet. Do not power on the VCR. The clock and tuner channels will automatically be set.

- Auto clock set is performed first. The auto clock set function scans all the channels received by your VCR to find the Host Channel and then sets the clock. "Auto" blinks on the front display panel during Auto clock set.
- Auto channel is performed next. The auto channel set function scans all the channels that are receivable by your VCR. It then automatically assigns each receivable channels to the **CH▲▼** buttons. It skips non-receivable channels. During auto channel set the channel numbers are displayed as they are scanned and set.
- When Plug & Play has been completed successfully the correct time is displayed.
- If "AUTO CLOCK SET" or "SEMI-AUTO CLOCK SET" is selected at the Override Auto Clock Set screen on page 10, the clock will be adjusted automatically by the Host PBS every hour on the hour (except for 11:00 PM, midnight, 1:00 AM and 2:00 AM) by the incoming PBS channel clock setting data. (This automatic clock adjustment can only be performed when the VCR's power is turned off. The clock will be adjusted on the hour based on the time displayed on the VCR, not on the actual real time.) The default setting is "AUTO CLOCK SET".
- If an incorrect time is displayed on the front display panel, you may be receiving the clock setting data of a PBS channel from an adjacent time zone, or an incorrect PBS channel from a cable TV system. In this case, perform the Semi-Auto (☞ pg. 10) or Manual Clock Set (☞ pg. 11) procedure. Auto channel set has already taken place and it need not be set again.
- If "- -:- -" appears on the display, your antenna cable may not be connected to the VCR, there may not be a Host PBS signal available in your area, or your cable box may not be set to the PBS channel. Ensure that the antenna cable is connected correctly. If you use a cable box ensure that your local PBS is selected o your cable box (☞ ATTENTION CABLE BOX SUBSCRIBERS). Then power on and power off the VCR; the Plug & Play function will be automatically reactivated and "Auto" will be displayed on the VCR's front panel. If everything is connected and set correctly, perform the Manual Clock Set procedure (☞ pg. 11). Auto channel set has not yet taken place, so please also perform the "Set Receivable Channels" procedure (☞ pg. 12).



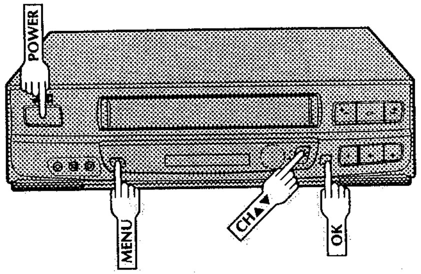
During Initial Auto Clock Set
"Auto" blinks.

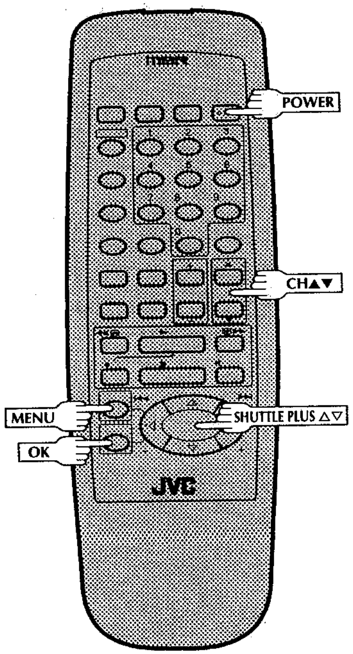
During Auto Channel Set
The channel numbers are displayed as they are scanned and set.

Plug & Play Completed
The current time (including AM/PM) is displayed.

Language

Turn on the TV and select the VCR channel 3 or 4 (or AV mode).


POWER
MENU
CH▲▼
OK


POWER
CH▲▼
MENU
OK
SHUTTLE PLUS △▽
JVC

This VCR offers you the choice to view on-screen messages in English, Spanish or French (not including messages superimposed on the TV picture). Select the desired language using this procedure. The default setting is "ENGLISH".

1 TURN ON THE VCR

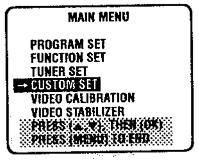
Press **POWER**.

2 ACCESS ON-SCREEN MENU

Press **MENU**.

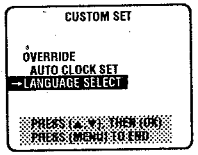
3 ACCESS CUSTOM SET SCREEN

At the Main Menu screen, move the highlight bar (arrow) to "CUSTOM SET" by pressing **CH▲▼** or **SHUTTLE PLUS** △▽, then press **OK**.


MAIN MENU
PROGRAM SET
FUNCTION SET
TUNER SET
→CUSTOM SET
VIDEO CALIBRATION
VIDEO STABILIZER
PRESS (▲,▼), THEN (OK)
PRESS (MENU) TO END

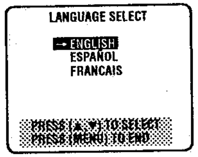
4 ACCESS LANGUAGE SELECT SCREEN

The messages are preset to appear in English. If you want to see them in Spanish or French, move the highlight bar (arrow) to "LANGUAGE SELECT" by pressing **CH▲▼** or **SHUTTLE PLUS** △▽, then press **OK**.


CUSTOM SET
OVERRIDE
AUTO CLOCK SET
→LANGUAGE SELECT
PRESS (▲,▼), THEN (OK)
PRESS (MENU) TO END

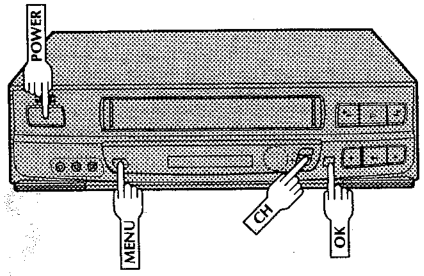
5 SELECT LANGUAGE

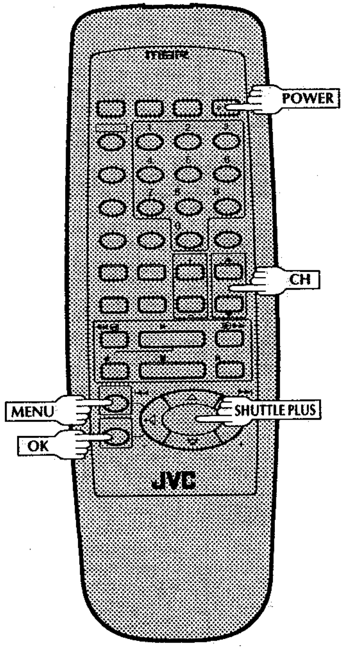
At the Language Select screen, move the highlight bar (arrow) to the desired language by pressing **CH▲▼** or **SHUTTLE PLUS** △▽, then press **MENU** as many times as necessary to return to the normal screen.


LANGUAGE SELECT
→ENGLISH
ESPAÑOL
FRANCAIS
PRESS (▲,▼) TO SELECT
PRESS (MENU) TO END

Clock

Turn on the TV and select the VCR channel 3 or 4 (or AV mode).


POWER
MENU
CH
OK


POWER
CH
MENU
OK
SHUTTLE PLUS
JVC

Perform clock setting only if the clock has not been set correctly by the Plug & Play function. Access the Override Auto Clock Set screen to choose the Auto, Semi-Auto or Manual clock setting procedure. Each procedure starts from step 5. *Auto need only be selected if Semi-Auto or Manual had previously been selected.

Preparation

1 TURN ON THE VCR

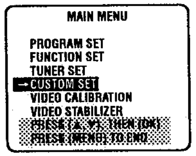
Press **POWER**.

2 ACCESS ON-SCREEN MENU

Press **MENU**.

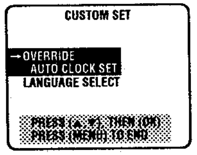
3 ACCESS CUSTOM SET SCREEN

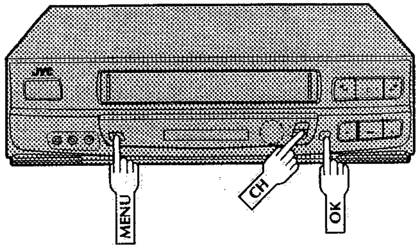
At the Main Menu screen, move the highlight bar (arrow) to "CUSTOM SET" by pressing **CH▲▼** or **SHUTTLE PLUS** △▽, then press **OK**.

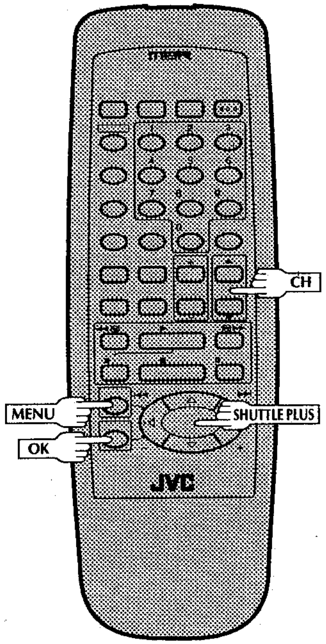

MAIN MENU
PROGRAM SET
FUNCTION SET
TUNER SET
→CUSTOM SET
VIDEO CALIBRATION
VIDEO STABILIZER
PRESS (▲,▼), THEN (OK)
PRESS (MENU) TO END

4 ACCESS CLOCK SET MODE SELECT SCREEN

Move the highlight bar (arrow) at the Custom Set screen to "OVERRIDE AUTO CLOCK SET" by pressing **CH▲▼** or **SHUTTLE PLUS** △▽, then press **OK**.


CUSTOM SET
→OVERRIDE
AUTO CLOCK SET
LANGUAGE SELECT
PRESS (▲,▼), THEN (OK)
PRESS (MENU) TO END



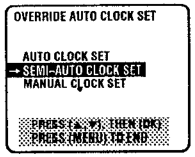

CH
MENU
SHUTTLE PLUS
OK
JVC

Semi-Auto

5

SELECT MODE

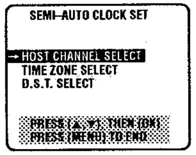
At the Override Auto Clock Set screen, move the highlight bar (arrow) to "SEMI-AUTO CLOCK SET" by pressing **CH▲▼** or **SHUTTLE PLUS** △▽, then press **OK**.


OVERRIDE AUTO CLOCK SET
AUTO CLOCK SET
→ SEMI-AUTO CLOCK SET
MANUAL CLOCK SET
PRESS (▲,▼), THEN (OK)
PRESS (MENU) TO END

6

ACCESS SELECT SCREENS

At the Semi-Auto Clock Set screen, move the highlight bar (arrow) to the desired mode by pressing **CH▲▼** or **SHUTTLE PLUS** △▽, then press **OK**.


SEMI-AUTO CLOCK SET
→ HOST CHANNEL SELECT
TIME ZONE SELECT
D.S.T. SELECT
PRESS (▲,▼), THEN (OK)
PRESS (MENU) TO END

To select the Host Channel — step **7**
To select the Time Zone — step **8**
To select the D.S.T. mode — step **9**

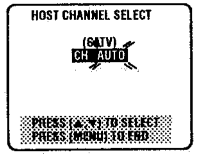
NOTE:

The time that has been set previously by the Plug & Play function will be erased when any of the three settings mentioned above is changed.

7

SELECT HOST CHANNEL

You can either select "AUTO", or enter a PBS channel number. For automatic selection, press **MENU** if "AUTO" is highlighted on the Host Channel Select screen. To manually select "AUTO" or the PBS channel, press **CH▲▼** or **SHUTTLE PLUS** △▽ to cycle through "AUTO" or the channel numbers (hold button down to speed through numbers) and stop when the desired number appears. Press **MENU** and the Semi-Auto Clock Set screen reappears.


HOST CHANNEL SELECT
(CATV)
CH AUTO
PRESS (▲,▼) TO SELECT
PRESS (MENU) TO END

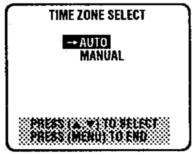
NOTES:

- *For cable box users: Select "AUTO" or the channel on your VCR that receives the cable box channels, and set the cable box to the PBS channel.*
- *There are some PBS channels that do not transmit clock setting data.*

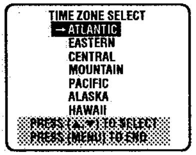
8

SELECT TIME ZONE

You can select the zone automatically or manually by pressing **CH▲▼** or **SHUTTLE PLUS** △▽. If an incorrect time is displayed you may be receiving the clock setting data of a PBS channel from an adjacent time zone of from an incorrect PBS channel from a cable TV system. If you selected "AUTO" in step **7** select "MANUAL" and select the correct time zone manually.


TIME ZONE SELECT
→ AUTO
MANUAL
PRESS (▲,▼) TO SELECT
PRESS (MENU) TO END

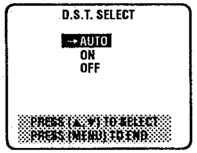
- If you selected "AUTO", press **MENU** to return to the Semi-Auto Clock Set screen.
- If you selected "MANUAL", press **OK** and the screen to the right appears. Move the highlight bar (arrow) to your choice by pressing **CH▲▼** or **SHUTTLE PLUS** △▽, then press **MENU** twice to return to the Semi-Auto Clock Set screen.


TIME ZONE SELECT
→ ATLANTIC
EASTERN
CENTRAL
MOUNTAIN
PACIFIC
ALASKA
HAWAII
PRESS (▲,▼) TO SELECT
PRESS (MENU) TO END

9

SELECT D.S.T. MODE

You have three choices:
a–Select "AUTO" and the adjustment to your VCR's clock will be made according to the incoming signal from the host channel.
b–Select "ON" and the adjustment will be made based on the clock itself.
c–Select "OFF" if Daylight Saving Time doesn't apply to you.
Move the highlight bar (arrow) to your choice by pressing **CH▲▼** or **SHUTTLE PLUS** △▽, then press **MENU** and the Semi-Auto Clock Set screen reappears.


D.S.T. SELECT
→ AUTO
ON
OFF
PRESS (▲,▼) TO SELECT
PRESS (MENU) TO END

IMPORTANT
Turn the VCR off after performing the Semi-Auto Clock Set procedure. "Auto" will appear on the front display panel when the clock is being set. The current time will appear automatically when the clock is set.

Manual

5

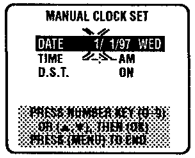
SELECT MODE

At the Override Auto Clock Set screen (☞ pg. 10), move the highlight bar (arrow) to "MANUAL CLOCK SET" by pressing **CH▲▼** or **SHUTTLE PLUS** △▽, then press **OK**.

6

SET DATE, TIME AND D.S.T.

The Manual Clock Set screen is displayed and the month digit begins blinking. Press the appropriate **NUMBER** keys to set the date and time (if only 1 digit, press "0" first). Press **CH▲▼** or **SHUTTLE PLUS** △▽ to set AM/PM and D.S.T. (Daylight Saving Time). Press **OK** after AM/PM and D.S.T. settings.
Set D.S.T. to "ON" to set the D.S.T. according to the VCR's clock or to "OFF" if D.S.T. doesn't apply to you.


MANUAL CLOCK SET
DATE 1/ 1/97 WED
TIME AM
D.S.T. ON
PRESS NUMBER KEY (0–9)
OR (▲,▼), THEN (OK)
PRESS (MENU) TO END

When you're finished with this set-up procedure, press **MENU** to start the clock.

NOTES:

- ***CH▲▼** and **SHUTTLE PLUS** △▽ can be used to perform all operations. (In this case, press **OK** after each setting.)*
- *At the Manual Clock Set screen, the setting that can be set blinks. When setting of a highlighted item is completed, the highlight bar moves down by 1 line to the next item.*

7

MAKE CORRECTIONS

To change any of the settings, press **OK** or **SHUTTLE PLUS** ◁▷ until the item you want to change blinks, then set as in step **6**.

Auto

5

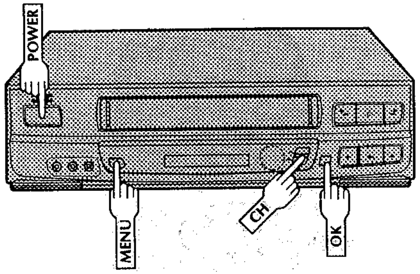
SELECT MODE

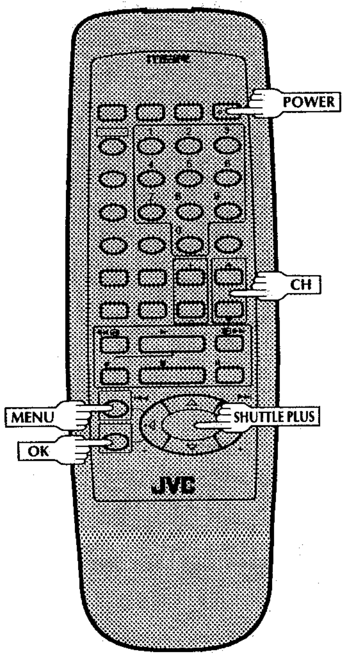
At the Override Auto Clock Set screen, move the highlight bar (arrow) to "AUTO CLOCK SET" by pressing **CH▲▼** or **SHUTTLE PLUS** △▽, then power off the VCR. Do not power it on again until the clock has been adjusted. The clock is automatically adjusted on the hour except at 11:00 PM, midnight, 1:00 AM and 2:00 AM. (The clock will be adjusted on the hour based on the time displayed on the VCR, not on the actual real time.)

****AUTO DAYLIGHT SAVING TIME**
This function enables automatic adjustment of the VCR's clock at the start and end of Daylight Saving Time.
With Auto DST activated, . . .
. . . on the first Sunday of April at 2:00 AM, the clock is adjusted to 3:00 AM.
. . . on the last Sunday of October at 2:00 AM, the clock is adjusted to 1:00 AM.

Tuner

Turn on the TV and select the VCR channel 3 or 4 (or AV mode).





Set Receivable Channels

1 TURN ON THE VCR

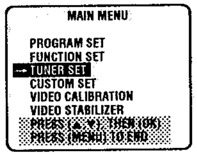
Press **POWER**.

2 ACCESS MAIN MENU SCREEN

Press **MENU**.

3 ACCESS TUNER SET SCREEN

Move the highlight bar (arrow) to "TUNER SET" by pressing **CH▲▼** or **SHUTTLE PLUS** △▽, then press **OK**.

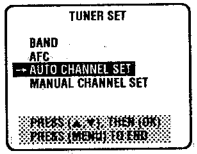


MAIN MENU

PROGRAM SET
FUNCTION SET
→ TUNER SET
CUSTOM SET
VIDEO CALIBRATION
VIDEO STABILIZER
PRESS (▲,▼), THEN (OK)
PRESS (MENU) TO END

4 PERFORM AUTO CHANNEL SET

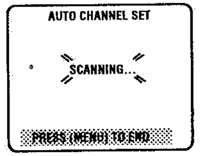
Move the highlight bar (arrow) to "AUTO CHANNEL SET" by pressing **CH▲▼** or **SHUTTLE PLUS** △▽, then press **OK**.



TUNER SET

BAND
AFC
→ AUTO CHANNEL SET
MANUAL CHANNEL SET

PRESS (▲,▼), THEN (OK)
PRESS (MENU) TO END



AUTO CHANNEL SET

SCANNING...

PRESS (MENU) TO END

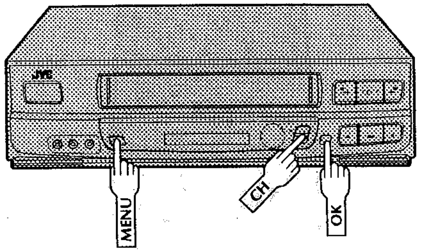
- Receivable channels in your area are automatically assigned to the **CH▲▼** buttons, and non-receivable channels are skipped.

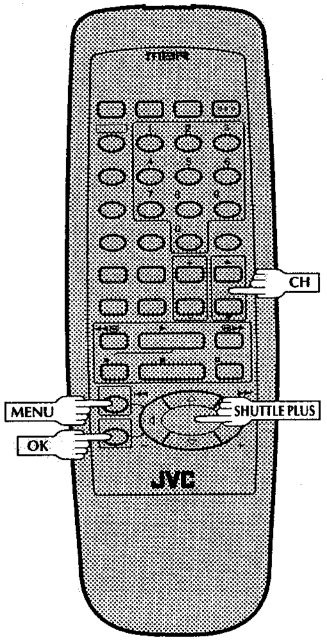
NOTES:

- *At the end of Auto Channel Set, "SCAN COMPLETED" appears on screen.*
- *If the scan was unsuccessful, "SCAN COMPLETED–NO SIGNAL" appears on screen. Check the connections and start again.*

5 RETURN TO NORMAL SCREEN

Press **MENU** as many times as necessary.

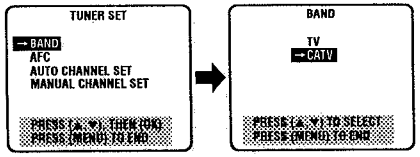




INFORMATION

The VCR detects the band (TV or CATV) and selects the correct band automatically during Auto Channel Set.
If necessary, you can check the setting at the Band screen.

- At the Tuner Set screen, move the highlight bar (arrow) to "BAND" by pressing **CH▲▼** or **SHUTTLE PLUS** △▽, then press **OK**.



TUNER SET

→ BAND
AFC
AUTO CHANNEL SET
MANUAL CHANNEL SET

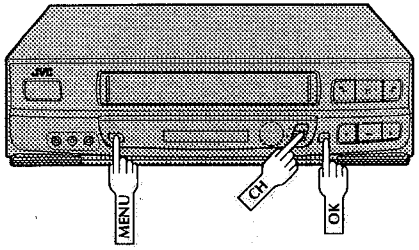
PRESS (▲,▼), THEN (OK)
PRESS (MENU) TO END

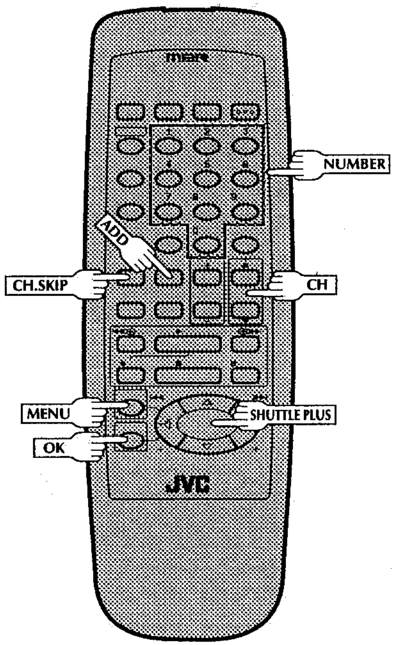
BAND

TV
→ CATV

PRESS (▲,▼) TO SELECT
PRESS (MENU) TO END

- Press **MENU** as many times as necessary to return to the normal screen.





Add Or Delete A Channel

1

ACCESS TUNER SET SCREEN

Access by performing steps **2** and **3** of the Tuner procedure on page 12.

- To add a channel, go to step **2**.
- To delete a channel, skip to step **4**.

2

ACCESS AFC SCREEN

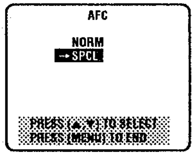
Move the highlight bar (arrow) to "AFC" by pressing **CH▲▼** or **SHUTTLE PLUS** △▽, then press **OK**.

3

MAKE SELECTION

Move the highlight bar (arrow) to "SPCL" by pressing **CH▲▼** or **SHUTTLE PLUS** △▽, then press **MENU** to return to the Tuner Set screen.

- AFC set to SPCL (special) is necessary for tuning on certain CATV systems.



AFC

NORM
→SPCL

PRESS (▲,▼) TO SELECT
PRESS (MENU) TO END

4

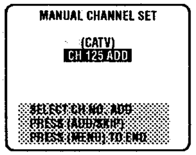
ACCESS MANUAL CHANNEL SET SCREEN

Move the highlight bar (arrow) to "MANUAL CHANNEL SET" by pressing **CH▲▼** or **SHUTTLE PLUS** △▽, then press **OK**.

5

STORE OR SKIP DESIRED CHANNEL

Input the channel number using the **NUMBER** keys or by pressing **CH▲▼** or **SHUTTLE PLUS** △▽, then press **ADD** to add or **CH.SKIP** to delete. Repeat for each channel you want to store or skip.



MANUAL CHANNEL SET

(CATV)
CH 125 ADD

SELECT CH NO. ADD
PRESS (ADD/SKIP)
PRESS (MENU) TO END

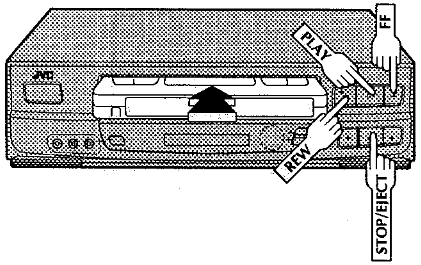
6

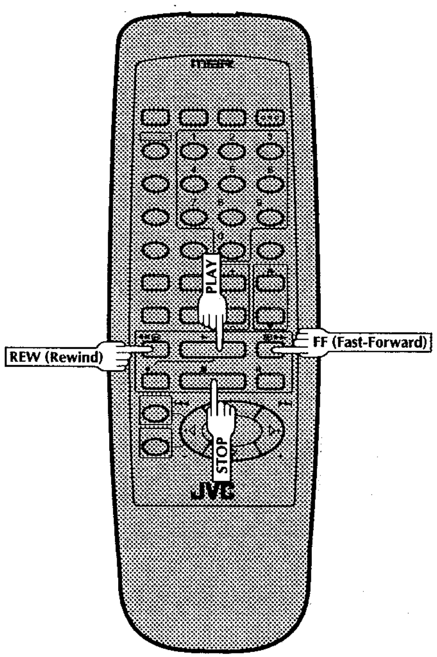
RETURN TO NORMAL SCREEN

Press **MENU** as many times as necessary.

Simple Playback

Turn on the TV and select the VCR channel 3 or 4 (or AV mode).





1

LOAD A CASSETTE

Make sure the window side is up, the rear label side is facing you and the arrow on the front of the cassette is pointing towards the VCR. Don't apply too much pressure when inserting.

- The VCR's power comes on automatically.
- The counter is automatically reset to "0H 00M 00S".
- If the cassette's record safety tab has been removed, playback begins automatically.

2

FIND PROGRAM START POINT

Press **REW** or **FF** if you want to rewind or fast forward to a different section of the tape.

3

START PLAYBACK

Press **PLAY**. "VIDEO CALIBRATION" appears on screen (☞ pg. 25).

4

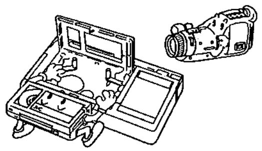
STOP PLAYBACK

Press **STOP** or **STOP/EJECT**. Then press **STOP/EJECT** to remove the cassette.

Usable cassettes

Full-Size VHS
T-30 (ST-30**)
T-60 (ST-60**)
T-90
T-120 (ST-120**)
T-160 (ST-160**)
ST-210**

Compact VHS*
TC-20 (ST-C20**)
TC-30 (ST-C30**)
TC-40 (ST-C40**)

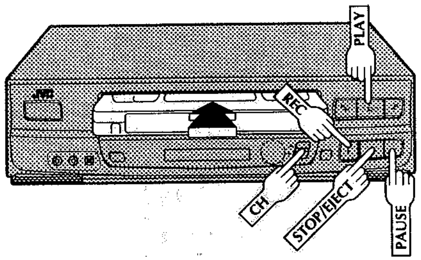


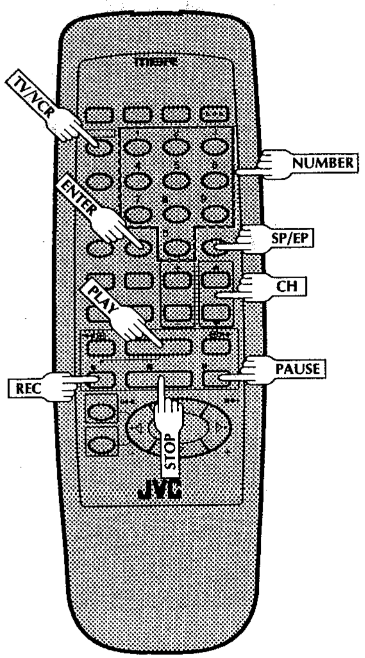
* Compact VHS camcorder recordings can be played on this video recorder. Simply place the recorded cassette into a VHS Cassette Adapter and it can be used just like any full-sized VHS cassette.

** This video recorder can record on regular VHS and Super VHS cassettes. However, it will record and play back regular VHS signals only. It is not possible to play back Super VHS recordings.

Simple Recording

Turn on the TV and select the VCR channel 3 or 4 (or AV mode).





1

LOAD A CASSETTE

Make sure the record safety tab is intact. If not, cover the hole with adhesive tape before inserting the cassette.

2

SELECT RECORDING CHANNEL

Press **CH▲▼**. Or press the appropriate **NUMBER** keys, then press **ENTER**. (The channel changes after a few seconds whether you press **ENTER** or not.)

- If you use the RF connection, by pressing the **TV/VCR** button, select VCR mode to view the program to be recorded.

3

SET TAPE SPEED

Press **SP/EP** to set the recording speed.

4

START RECORDING

Press and hold **REC** and press **PLAY** on the remote control, or press **REC** on the VCR's front panel.

Active Video Calibration takes place at the beginning of both the first SP and the first EP recording after inserting the cassette (☞ pg. 25).

5

PAUSE/RESUME RECORDING

Press **PAUSE**. Press **PLAY** to resume recording.

- During record pause, you can change the recording channel by using the **CH▲▼** buttons or **NUMBER** keys.

Active Video Calibration will not take place if the tape speed is changed while in record pause mode.

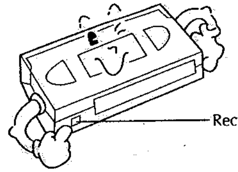
6

STOP RECORDING

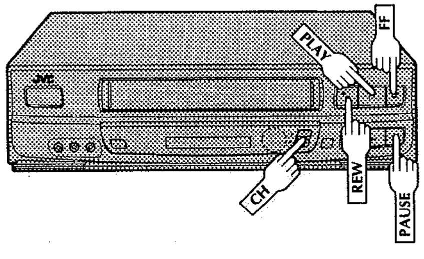
Press **STOP** or **STOP/EJECT**. Then press **STOP/EJECT** to remove the cassette.

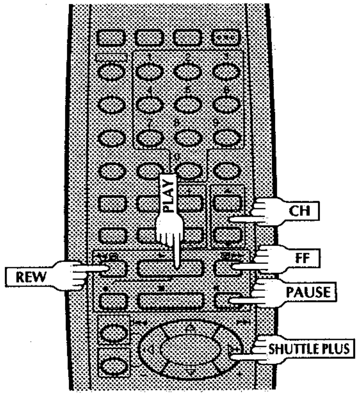
Accidental erasure prevention

- To prevent accidental recording on a recorded cassette, remove its record safety tab.
  To record on it later, cover the hole with adhesive tape.



Playback Features





High-Speed Search

1

ACTIVATE HIGH-SPEED SEARCH

During playback or still press **FF** for forward high-speed search, or **REW** for reverse high-speed search.

To resume normal playback, press **PLAY**.

NOTE:

*For short searches, during playback or still press and hold **FF** or **REW** for over 2 seconds. When released, normal playback resumes.*

Still Picture/Frame-By-Frame Playback

1

PAUSE DURING PLAYBACK

Press **PAUSE**. If there is vertical jitter, use the **CH ▲** or **▼** button to correct the picture.

2

ACTIVATE FRAME-BY-FRAME PLAYBACK

Press **PAUSE** repeatedly to advance one frame at a time.

OR

Press **SHUTTLE PLUS ⏮** or **⏭** repeatedly to advance one frame at a time.

Press **SHUTTLE PLUS ⏭** for forward frame by frame playback or **SHUTTLE PLUS ⏮** for reverse frame by frame.

To resume normal playback, press **PLAY**.

Slow Motion/Reverse Slow Motion

1

ACTIVATE SLOW-MOTION PLAYBACK

During still picture, press and hold **SHUTTLE PLUS ⏮** or **⏭**. Release to return to still picture.

OR

For hands-free slow-motion, press **SHUTTLE PLUS ⏮** during playback to decrease speed in the forward direction. Continue to press **⏮** to select the various slow motion, reverse slow motion, reverse play and reverse search modes.

To resume normal playback, press **PLAY**.

NOTE:

*If noise bars appear during slow motion, press **CH ▲** or **▼** a few times to remove the noise bars from screen.*

Variable-Speed Search/ Reverse Motion Playback

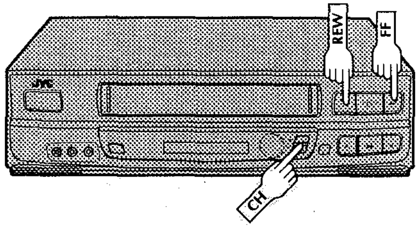
1

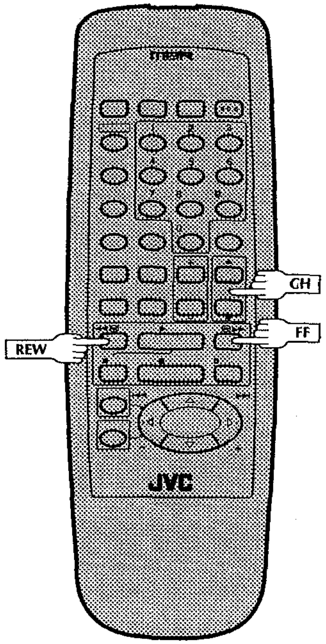
ACTIVATE VARIABLE-SPEED SEARCH

During playback, press **SHUTTLE PLUS ⏮** or **⏭**.

- To increase the speed in the forward direction, press **⏭** repeatedly to select the various forward search modes.
- To decrease the speed in the forward direction, press **⏮**.
- To play in reverse slow motion, and in reverse play mode, continue to press **⏮** after selecting all the forward slow motion modes.

To resume normal playback, press **PLAY**.




CH
FF
REW
JVC

Manual Tracking

Once playback begins, the VCR's automatic tracking function is engaged. If noise appears in the picture, you can override this and make the adjustment manually.

1 ENGAGE MANUAL TRACKING MODE

During playback, press the **CH▲** and **▼** buttons on the VCR's front panel simultaneously to cancel the automatic tracking mode and enable manual tracking adjust.

2 ADJUST MANUAL TRACKING

Press **CH▲** or **▼** on the VCR's front panel or remote. Press briefly for fine adjust, or press and hold for coarse adjust. Watch the screen and continue adjusting until optimum picture and sound quality are achieved.

3 RE-ENGAGE AUTOMATIC TRACKING

Press the **CH▲** and **▼** buttons on the VCR's front panel simultaneously.

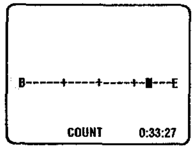
- When automatic tracking is re-engaged, video calibration is automatically activated.

NOTES:

- *To obtain a noiseless still picture it may be necessary to adjust tracking in slow playback and then engage Pause.*
- *Manual tracking is possible during hands-free slow-motion. During hands-free slow-motion playback, simply press* ***CH▲*** *or* ***▼*** *on the VCR's front panel or remote to adjust tracking.*

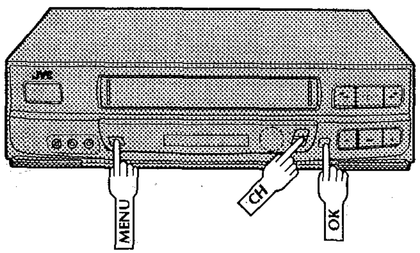
Tape Position Indicator

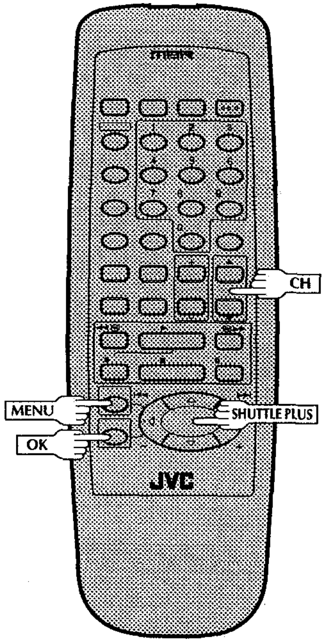
The Tape position indicator appears on screen when, from the stop mode, you press **FF**, **REW**, or perform an Index Search or Instant ReView. The position of "▮" in relation to "B" (Beginning) or "E" (End) shows you where you are on the tape.


B------+-----+-----+-▮---E
COUNT 0:33:27

NOTE:

"SUPERIMPOSE" must be set to "ON", or the indicator will not appear (☞ pg. 20).




CH
MENU
OK
SHUTTLE PLUS
JVC

Video Stabilizer

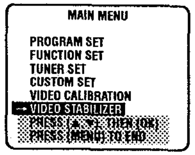
You can correct vertical vibration when playing back unstable EP recordings that were made on another VCR. When this function is set to "ON", vertical vibration will be automatically corrected. *The default setting is "OFF".

1 ACCESS MAIN MENU SCREEN

Press **MENU**.

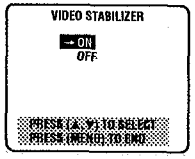
2 ACCESS VIDEO STABILIZER SCREEN

Move the highlight bar (arrow) to "VIDEO STABILIZER" by pressing **CH▲▼** or **SHUTTLE PLUS** △▽, then press **OK**.


MAIN MENU
PROGRAM SET
FUNCTION SET
TUNER SET
CUSTOM SET
VIDEO CALIBRATION
→ VIDEO STABILIZER
PRESS [▲,▼], THEN [OK]
PRESS [MENU] TO END

3 ACTIVATE VIDEO STABILIZER

Move the highlight bar (arrow) to "ON" by pressing **CH▲▼** or **SHUTTLE PLUS** △▽.

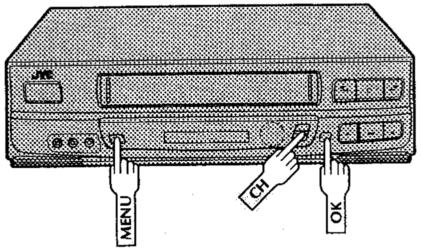

VIDEO STABILIZER
→ ON
OFF
PRESS [▲,▼] TO SELECT
PRESS [MENU] TO END

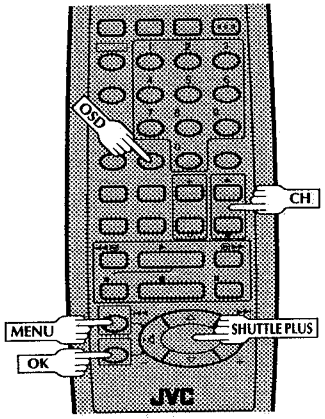
4 RETURN TO NORMAL SCREEN

Press **MENU**.

NOTES:

- *Regardless of the setting, this function has no effect with SP recordings, during recording and during special-effects playback.*
- *When you finish viewing the tape, be sure to set it back to "OFF".*




OSD
CH
MENU
SHUTTLE PLUS
OK
JVC

Superimpose

This function, switchable between ON and OFF, determines whether or not operational indicators will appear on screen.

1 ACCESS MAIN MENU SCREEN

Press **MENU**.

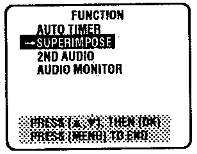
2 ACCESS FUNCTION SET SCREEN

Move the highlight bar (arrow) to "FUNCTION SET" by pressing **CH▲▼** or **SHUTTLE PLUS** △▽, then press **OK**.

3 ACCESS SUPERIMPOSE SCREEN

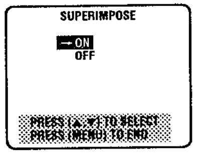
Move the highlight bar (arrow) to "SUPERIMPOSE" by pressing **CH▲▼** or **SHUTTLE PLUS** △▽, then press **OK**.

- "2ND AUDIO" and "AUDIO MONITOR" will appear with HR-J643U only.


FUNCTION
AUTO TIMER
→SUPERIMPOSE
2ND AUDIO
AUDIO MONITOR
PRESS [▲,▼], THEN [OK]
PRESS [MENU] TO END

4 SELECT MODE

Move the highlight bar (arrow) to "ON" or "OFF" by pressing **CH▲▼** or **SHUTTLE PLUS** △▽.


SUPERIMPOSE
→ON
OFF
PRESS [▲,▼] TO SELECT
PRESS [MENU] TO END

5 RETURN TO NORMAL SCREEN

Press **MENU** as many times as necessary.

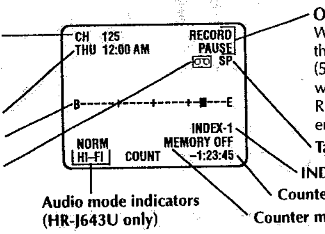
NOTE:

If you engage the Record Pause mode, RECORD/PAUSE is displayed whether "SUPERIMPOSE" is set to "ON" or "OFF".

To recall an indication

1. Press **OSD**.
   - All indications corresponding to the current status are displayed for 5 seconds, leaving the counter information, and RECORD/PAUSE if in the Record Pause mode, on the screen. (No indication during still and search.)
2. Press **OSD** again to clear the display.

The superimposed indication on the TV screen tells you what the VCR is doing.


CH 125
THU 12:00 AM
RECORD
PAUSE
SP
B----+----+----+-■---E
INDEX-1
NORM
HI-FI
COUNT
MEMORY OFF
-1:23:45

Tuned-in channel or AUX(iliary) mode
When the channel is changed, the new channel is displayed on the screen for 5 seconds.

Clock time

Tape position indicator

"Cassette Loaded" mark
When a cassette is loaded, the mark is displayed for 5 seconds. It blinks when the VCR's EJECT button is pushed.

Audio mode indicators (HR-J643U only)

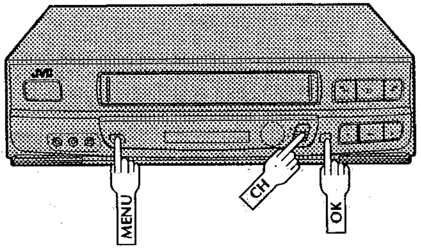
Operation mode
When the operation mode is changed, the new mode is displayed — RECORD (5 sec.), PLAY (5 sec.), FF/REW (5 sec. when engaged from Stop mode), RECORD PAUSE (for as long as Pause is engaged), and ITR *:** (5 sec.).

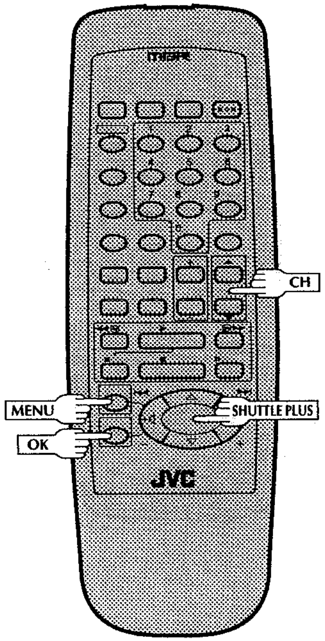
Tape speed indicator

INDEX indication

Counter reading

Counter memory on/off


JVC
MENU
CH
OK


CH
MENU
SHUTTLE PLUS
OK
JVC

Select The Soundtrack (HR-J643U Only)

Your VCR can record two soundtracks simultaneously (Normal and Hi-Fi) and play back the selected one, or both together.

1 ACCESS MAIN MENU SCREEN

Press **MENU** during playback or when VCR is in stop mode.

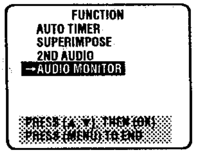
2 ACCESS FUNCTION SET SCREEN

Move the highlight bar (arrow) to "FUNCTION SET" by pressing **CH▲▼** or **SHUTTLE PLUS** △▽, then press **OK**.

3 ACCESS AUDIO MONITOR SCREEN

Move the highlight bar (arrow) to "AUDIO MONITOR" by pressing **CH▲▼** or **SHUTTLE PLUS** △▽, then press **OK**.

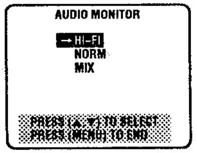
- "2ND AUDIO" and "AUDIO MONITOR" will appear with HR-J643U only.


FUNCTION
AUTO TIMER
SUPERIMPOSE
2ND AUDIO
→AUDIO MONITOR
PRESS [▲,▼], THEN [OK]
PRESS [MENU] TO END

4 SELECT MODE

You have three choices:
a– Hi-Fi
b– Normal
c– Mix

Move the highlight bar (arrow) to your choice by pressing **CH▲▼** or **SHUTTLE PLUS** △▽.

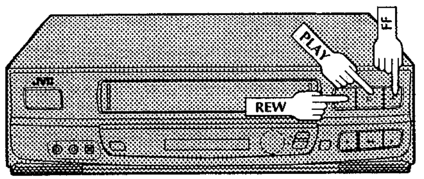

AUDIO MONITOR
→HI-FI
NORM
MIX
PRESS [▲,▼] TO SELECT
PRESS [MENU] TO END

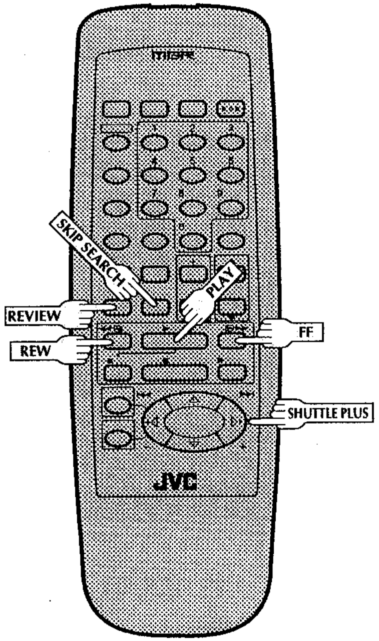
5 RETURN TO NORMAL SCREEN

Press **MENU** as many times as necessary.

NOTES:

- *If the tape being played back has no Hi-Fi soundtrack, the Normal soundtrack will be heard no matter what choice you make at the Audio Monitor screen.*
- *If RF connection is used for TV, even if Hi-Fi audio monitor is selected the sound will be mono and will be reproduced in both loudspeakers.*





Index Search

Index codes are placed on the tape at the start of each recording. You can find and automatically play back from the start of any recording using the Index Search function.

1

START SEARCH

While the tape is stopped, press **SHUTTLE PLUS |◀◀** or **▶▶|**.

2

ACCESS DISTANT CODE

To access a recording 2–9 index codes away, press **SHUTTLE PLUS |◀◀** or **▶▶|** repeatedly until the correct number is displayed on screen (only if SUPERIMPOSE is set to ON (☞ pg. 20). Playback begins automatically when the desired recording is located.

- If necessary press **REW** or **FF** when play starts to search visually to find the very beginning of the desired program.

NOTE:

An index code is not placed on the tape when recording is paused and then resumed.

Instant ReView

At the press of a button, you can power up your VCR, rewind the tape and begin viewing the most recent timer-recorded program.

1

ACTIVATE INSTANT REVIEW

After ensuring that the Timer mode is disengaged, press **REVIEW**.

- The power comes on and the VCR searches for the index code indicating the start of the last timer-recorded program, then begins playback automatically.
- You can access a program 2–9 index codes away from the current position on the tape. If, for example, you have 5 programs recorded and you want to watch the third one, press **REVIEW** three times.
- If necessary press **REW** or **FF** when play starts to search visually to find the very beginning of the desired program.
- If the tape is already rewound when **REVIEW** is pressed, it will play the tape from the beginning. It will not fast forward to an index code.
- The Instant Review function will also operate if the VCR's power is on.

Skip Search

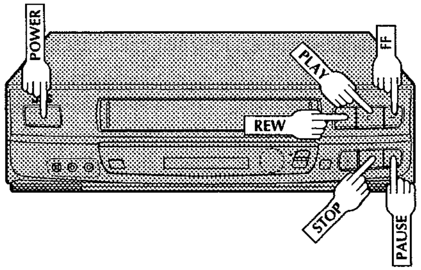
1

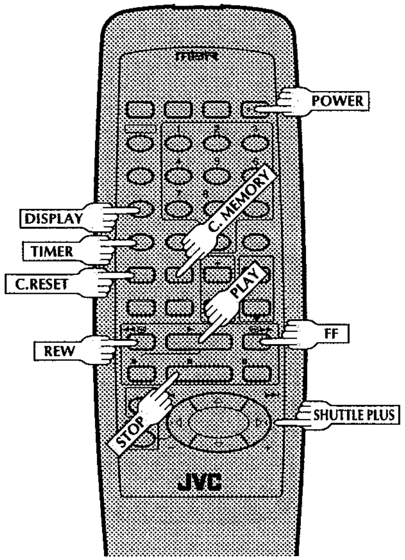
SKIP OVER UNWANTED SECTIONS

Press **SKIP SEARCH** 1 to 4 times during playback. Each press initiates a 30-second period of fast-motion playback. Normal playback resumes automatically.

NOTE:

*To return to normal playback during a Skip Search, press **PLAY**.*





Next-Function Memory

The Next Function Memory "tells" the VCR what to do after rewinding. * Before continuing, ensure that the VCR is in stop mode.

a– For Automatic Start Of Playback After Tape Rewind . . .
. . . press **REW**, then press **PLAY** within 2 seconds.
b– For Automatic Power Off After Tape Rewind . . .
. . . press **REW**, then press **POWER** within 2 seconds.
c– For Automatic Timer Standby After Tape Rewind . . .
. . . press **REW**, then press **TIMER** within 2 seconds.

NOTE:

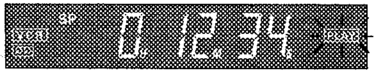
*If you want the "next function" to automatically start when the counter reads "0H 00M 00S" (instead of at the beginning of the tape), press **C. MEMORY** so that the counter memory indicator appears on the front display panel before pressing **REW**.*

Repeat Playback

1

START REPEAT

Press and hold **PLAY** (until "PLAY" blinks on the front display panel) during playback, then release.



- The entire tape is played back 20 times.

2

STOP REPEAT

To stop, press **STOP** at any time.

NOTE:

*Pressing **PLAY, REW, FF, PAUSE** or **SHUTTLE PLUS |◀◀** or **▶▶|** also stops Repeat Playback.*

Counter Reset

1

RESET COUNTER TO ZERO

Press **C.RESET**.

NOTE:

*By pressing the **DISPLAY** button, you can change the display to show the counter reading, channel number or clock time. (Channel number is not displayed during playback.)*

Counter Memory

When **REW** or **FF** is pressed, with the Counter Memory activated, the tape will return to the counter position "zero".

1

ACTIVATE COUNTER MEMORY

Press **C.RESET** during playback at a point you want to have quick access to later. The counter reads "0H 00M 00S".

Then press **C.MEMORY**. The Counter Memory indicator ("M") in the front display panel lights.

2

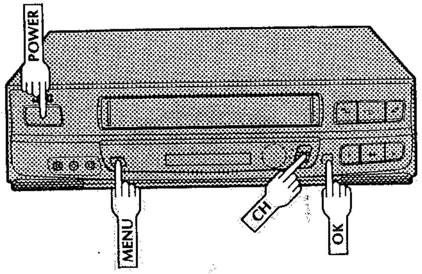
RETURN TO COUNTER POSITION ZERO

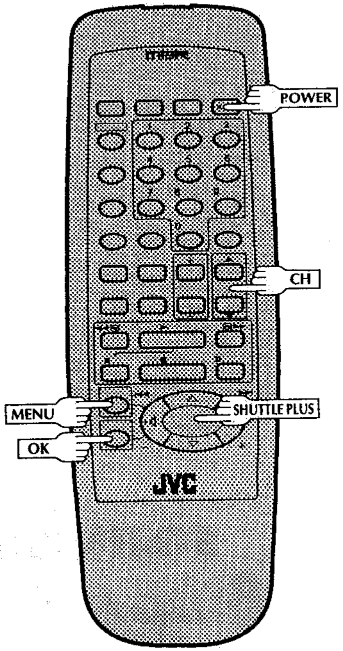
Press **STOP** (during playback), then press **REW** or **FF**. The tape rewinds or fast-forwards and stops at approximately "0H 00M 00S" automatically.

- To cancel Counter Memory, press **C.MEMORY**.

Active Video Calibration

Turn on the TV and select the VCR channel 3 or 4 (or AV mode).





Active Video Calibration checks the condition of the tape during recording and playback, and compensates for poor reproduction to provide the best quality recording and playback pictures. *The default setting for both recording and playback is "ON".

Preparation

1 TURN ON THE VCR

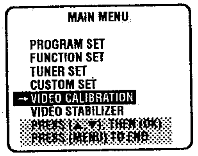
Press **POWER**.

2 ACCESS MAIN MENU SCREEN

Press **MENU**.

3 ACCESS VIDEO CALIBRATION SCREEN

Press **CH▲▼** or **SHUTTLE PLUS** △▽ to move the highlight bar (arrow) to "VIDEO CALIBRATION", then press **OK**.

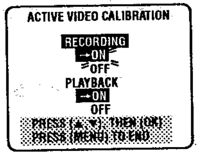


MAIN MENU

PROGRAM SET
FUNCTION SET
TUNER SET
CUSTOM SET
→VIDEO CALIBRATION
VIDEO STABILIZER
PRESS (▲,▼), THEN (OK)
PRESS (MENU) TO END

4 SELECT MODE

The Recording section is highlighted. Move the bar (arrow) to "ON" or "OFF" to set the recording mode by pressing **CH▲▼** or **SHUTTLE PLUS** △▽, then press **OK**. The playback section is then highlighted. Move the bar (arrow) to "ON" or "OFF" to set the playback mode by pressing **CH▲▼** or **SHUTTLE PLUS** △▽. Press **MENU** to return to the normal screen. (Pressing **OK** returns the highlight bar to the Recording section.)

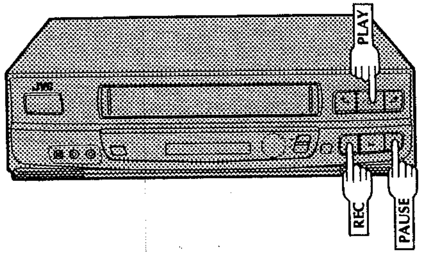


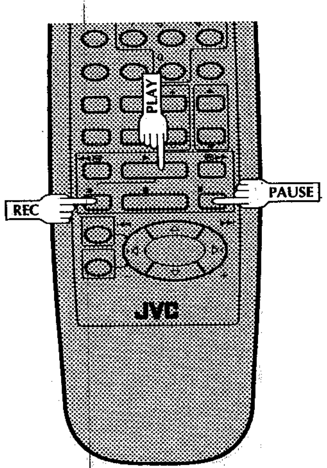
ACTIVE VIDEO CALIBRATION

RECORDING
→ON
OFF
PLAYBACK
→ON
OFF
PRESS (▲,▼), THEN (OK)
PRESS (MENU) TO END

NOTE:

When recording or when playing back tapes recorded on this VCR set the Active Video Calibration to "ON".





Playback

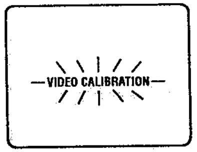
The VCR assesses the quality of the tape once you start playback.

Before beginning, perform steps **1** and **2** on page 15 ("Simple Playback") before continuing.

1 START PLAYBACK

Press **PLAY**.

- The VCR adjusts the playback picture quality based on the quality of the tape in use.



VIDEO CALIBRATION

NOTES:

- *When using rental tapes, or tapes recorded on other VCRs, set "PLAYBACK" in step 4 of the Preparation procedure to either "ON" or "OFF" as desired to give the best picture (☞ pg. 24).*
- *The Video Calibration screen only appears at the beginning of automatic tracking. Even though the screen doesn't appear after that, the Active Video calibration function is operative.*
- *"SUPERIMPOSE" must be set to "ON" or the Video Calibration screen will not appear (☞ pg. 20).*

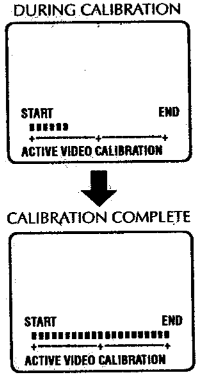
Recording

Perform steps **1** – **3** on page 16 ("Simple Recording") before continuing.

1 START RECORDING

Press and hold **REC** and press **PLAY** on the remote control, or press **REC** on the VCR's front panel.

- The VCR takes about 7 seconds to assess the quality of the tape in use, then recording begins with the picture level optimized.



DURING CALIBRATION

START END
ACTIVE VIDEO CALIBRATION

CALIBRATION COMPLETE

START END
ACTIVE VIDEO CALIBRATION

NOTES:

- *Calibration occurs immediately prior to both the first SP and the first EP recording after inserting the cassette. It does not take place during recording.*
- *In the case of timer recording, calibration takes place for both SP and EP before the first timer recording after inserting the cassette (regardless of the tape speed selected for that recording).*
- *Once the cassette is ejected, the calibration data is canceled. The next time the cassette is used for recording, calibration is re-performed.*
- *While Active Video Calibration is operative, the PAUSE button will not function.*
- *SUPERIMPOSE must be set to "ON" or the Active Video Calibration screen will not appear (☞ pg. 20).*

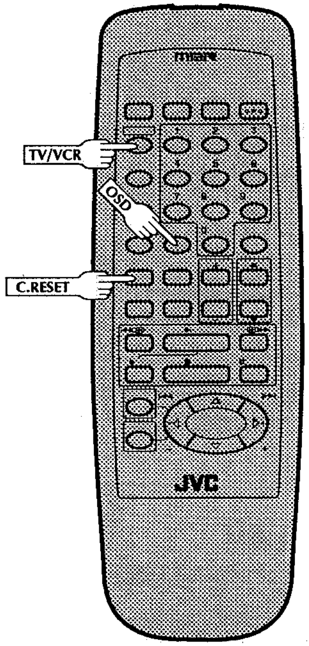
ATTENTION:

- ■ As calibration takes place before recording actually starts, there is a delay of about 7 seconds after **REC** and **PLAY** on the remote, or **REC** on the VCR's front panel, are pressed. To make sure you record the desired scene or program completely, first perform the following steps:

1) Press and hold **PAUSE**, and press **REC** to engage the RECORD PAUSE mode.
   - The VCR then automatically checks the condition of the tape and, after about 7 seconds, re-enters RECORD PAUSE.
2) Press **PLAY** to start recording.

- ■ If you want to bypass Active Video Calibration and start recording right away, set "RECORDING" to "OFF" in step **4** of the Preparation procedure (☞ pg. 24).

Recording Features



Record One Program While Watching Another

1

ENGAGE TV MODE

During recording...

- Press **TV/VCR**. The VCR's VCR indicator goes out. (If you are using the RF connection (☞ pg. 6) to view the output from your VCR, the TV broadcast being recorded disappears.)
- If you are using the AV connection (☞ pg. 6), to view the output from your VCR, change the TV's input mode from AV to TV.

2

SELECT CHANNEL FOR VIEWING

Use the TV's channel selector to set the channel you want to watch.

Display Elapsed Recording Time

1

RESET COUNTER TO ZERO

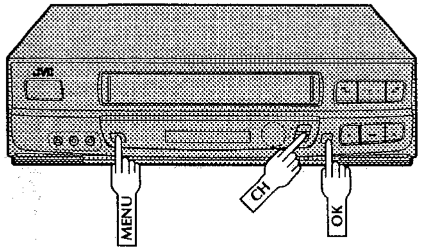
Before recording starts, press **C.RESET**. The counter resets to zero and displays the exact elapsed time as the tape runs.

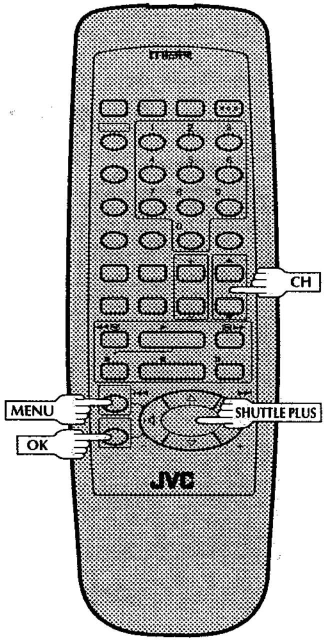
2

DISPLAY ELAPSED TIME ON SCREEN

During recording, press **OSD** at any time to see the elapsed time. All indications corresponding to the current status of the VCR are displayed for 5 seconds. The counter display remains on the screen indicating the elapsed time. Press **OSD** again to remove the display.

- Make sure "SUPERIMPOSE" is set to "ON" (☞ pg. 20).
- The indications are not be recorded.





NOTES:

- *If a SAP program is received, the SAP audio is recorded on both the Normal and Hi-Fi tracks. The main audio program is not recorded.*
- *If a non-SAP program is received, the main audio is recorded on both the Hi-Fi and Normal audio tracks.*

Stereo And SAP (Second Audio Program) (HR-J643U Only)

Your VCR's built-in MTS decoder enables reception of Multi-channel TV Sound broadcasts.

- The ST indicator on the front display panel lights during stereo broadcast reception, and SAP lights during SAP program reception.
- Both indicators light when a stereo program is accompanied by SAP audio.

To Record Stereo Programs . . .
. . . simply follow the basic recording procedure.

To Listen To Stereo Soundtrack During Recording . . .
. . . select "HI-FI" at the Audio Monitor screen (☞ pg. 21).

To Record SAP Programs . . . (HR-J643U Only)

1

ACCESS MAIN MENU SCREEN

Press **MENU**.

2

ACCESS FUNCTION SET SCREEN

Move the highlight bar (arrow) to "FUNCTION SET" by pressing **CH▲▼** or **SHUTTLE PLUS** △▽, then press **OK**.

3

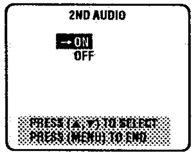
ACCESS 2ND AUDIO SCREEN

Move the highlight bar (arrow) to "2ND AUDIO" by pressing **CH▲▼** or **SHUTTLE PLUS** △▽, then press **OK**.

4

SELECT MODE

Move the highlight bar (arrow) to "ON" by pressing **CH▲▼** or **SHUTTLE PLUS** △▽.



2ND AUDIO

→ON
OFF

PRESS (▲, ▼) TO SELECT
PRESS (MENU) TO END

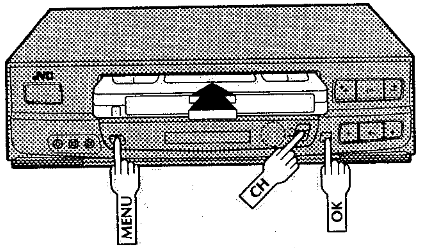
5

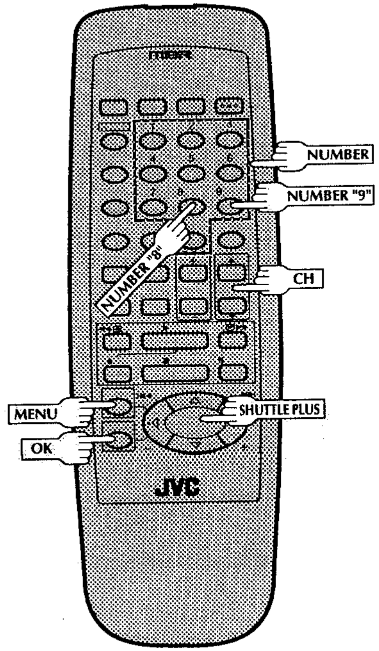
RETURN TO NORMAL SCREEN

Press **MENU** as many times as necessary.

On-Screen Timer Programming

Turn on the TV and select the VCR channel 3 or 4 (or AV mode).





You can directly program the VCR's timer to record up to 8 shows, as far as a year in advance. Remember, the clock must be set before you can program the timer (☞ pg. 7 or 9).

1 LOAD A CASSETTE

Make sure the record safety tab is intact. If not, cover the hole with adhesive tape, then load.

- The VCR comes on, and the counter is reset, automatically.

2 ACCESS ON-SCREEN MENU

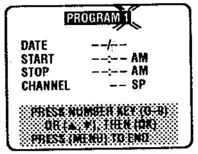
Press **MENU**.

3 ACCESS PROGRAM SET SCREEN

Make sure the highlight bar (arrow) is on "PROGRAM SET", then press **OK**.

4 SELECT PROGRAM NUMBER

Press the appropriate **NUMBER** keys or **CH▲▼** or **SHUTTLE PLUS** △▽ to select a vacant program number, then press **OK**. The first time you set the timer programming function, all the program numbers will be blank; in this case just press **OK** when the Program Set screen appears.



PROGRAM 1

```
DATE       --/--
START      --:-- AM
STOP       --:-- AM
CHANNEL       -- SP
```

PRESS NUMBER KEY (0-9)
OR (▲, ▼), THEN (OK)
PRESS (MENU) TO END

5 SET PROGRAM INFORMATION

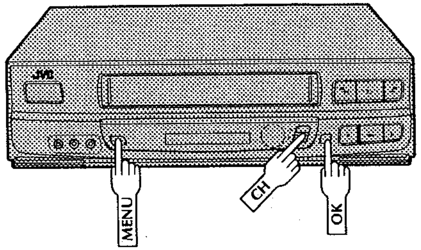
Press the appropriate **NUMBER** keys to set the date, start/stop time and channel number. Press **CH▲▼** or **SHUTTLE PLUS** △▽ to set AM/PM and tape speed (SP or EP). Press **OK** after AM/PM, channel number and tape speed settings.

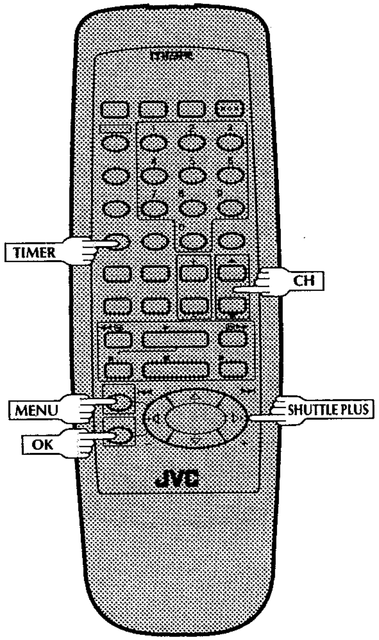
- Any information comprised of 1 digit (except the channel number) should have a "0" entered before it.
- It is possible to set all information using the **CH▲▼** or **SHUTTLE PLUS** △▽ button. (In this case, press **OK** after each setting.) Do not use the **CH ▼** or **SHUTTLE PLUS** ▽ button to set the date.
- At the Program Set screen, the setting that can be set blinks. When setting of a highlighted item is completed, the highlight bar moves down by 1 line to the next item.

NOTE:

If you are using a cable box, enter the cable box channel, not the channel to be recorded. The channel to be recorded must be selected on the cable box. (The cable box channel is the VCR's channel that displays the channels received by the cable box.)

** You can record selected programs at the same time every weekday, or once a week. Before entering the month, press **NUMBER** key "8" (DAILY) or "9" (WEEKLY). Either "DAILY" or "WEEKLY" appears. Press again and "DAILY" or "WEEKLY" disappears. For weekly recording, the desired date for the day of the week must be entered.





6 MAKE CORRECTIONS

To change any of the settings, press **OK** or **SHUTTLE PLUS** ◁ ▷ until the item you want to change begins blinking. Then set as in step **5**.

7 RETURN TO NORMAL SCREEN

Press **MENU** as many times as necessary.

- Press just once to access the Auto Timer screen (☞ pg. 31).

8 ENGAGE TIMER MODE

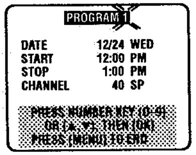
Press **TIMER**. The VCR turns off automatically.

NOTES:

- *To disengage the timer before recording starts, press **TIMER** again. Pressing once more re-engages it.*
- *In case of a power failure after programming, the VCR's memory backup keeps your selections for approximately 10 minutes.*
- *If you select "PROGRAM SET" without having set the date and time, an error message appears. Follow its instructions.*
- *If you enter a start time that has already passed, "ERROR" appears on the screen and blinks.*
- *Programs that start after midnight must have the next day's date.*
- *After timer recording is completed, the VCR's power goes off automatically.*
- *You can program the timer while a regular recording is in progress; the on-screen menu will not be recorded.*
- *If the end of tape is reached during timer recording, the cassette is automatically ejected.*
- *When timer-recording cable or satellite channels through an external tuner, be sure to keep the cable box or satellite receiver's power ON.*

EXAMPLE

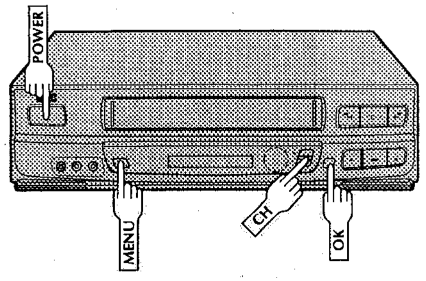
If you program the VCR to timer record a show on December 24 on channel 40 from 12:00 noon to 1:00 PM in SP mode, the screen will look like this:

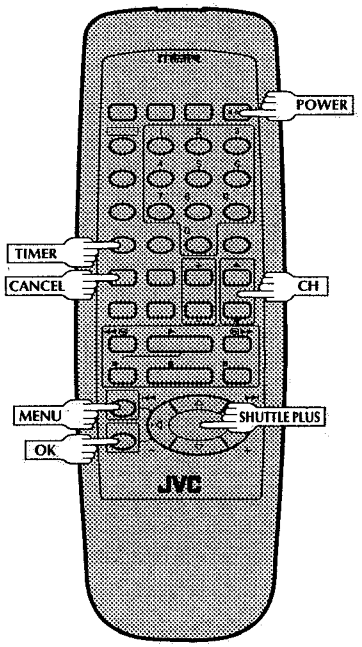


PROGRAM 1

```
DATE       12/24 WED
START      12:00 PM
STOP        1:00 PM
CHANNEL       40 SP
```

PRESS NUMBER KEY (0-9)
OR (▲, ▼), THEN (OK)
PRESS (MENU) TO END





Check And Cancel Programs

1
DISENGAGE TIMER
Press **TIMER**, then press **POWER**.

2
ACCESS MAIN MENU SCREEN
Press **MENU**.

3
ACCESS PROGRAM SET SCREEN
Press **CH▲▼** or **SHUTTLE PLUS** △▽ to move the highlight bar (arrow) to "PROGRAM SET", then press **OK**.

4
CHECK PROGRAM INFORMATION
Press **CH▲▼** or **SHUTTLE PLUS** △▽ to check the programs in succession.

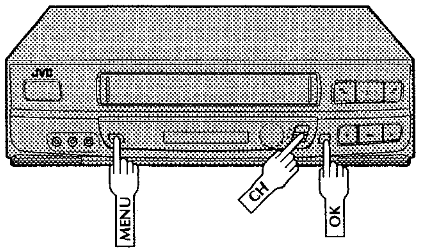
To Cancel A Program . . .

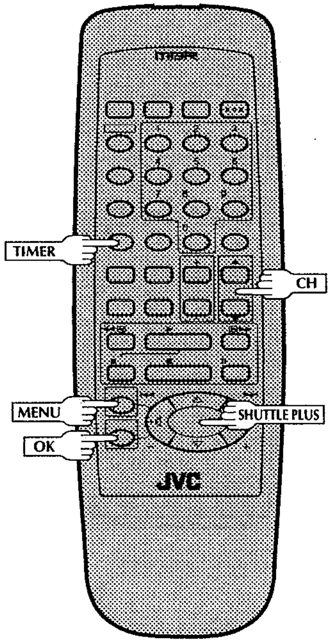
5
CANCEL A PROGRAM
Press **CANCEL**.

- Repeat steps **4** and **5** as many times as necessary.

6
RETURN TO NORMAL SCREEN
Press **MENU**. If there are still programs remaining, go to step **7**.

7
RE-ENGAGE TIMER
Press **TIMER** again.





Auto Timer

When the Auto Timer is set to ON the timer is automatically engaged when the VCR's power is turned off and automatically disengaged when the VCR is powered back on.

1
ACCESS MAIN MENU SCREEN
Press **MENU**.

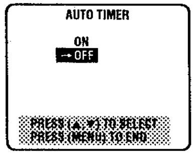
2
ACCESS FUNCTION SET SCREEN
Move the highlight bar (arrow) to "FUNCTION SET" by pressing **CH▲▼** or **SHUTTLE PLUS** △▽, then press **OK**.

3
ACCESS AUTO TIMER SCREEN
Move the highlight bar (arrow) to "AUTO TIMER" by pressing **CH▲▼** or **SHUTTLE PLUS** △▽, then press **OK**. Now skip to step **2** of the procedure below.

Or, during on-screen timer programming ...

1
ACCESS AUTO TIMER SCREEN
In step **7** in the On-Screen Timer Programming procedure (☞ pg. 29), press **MENU**.

2
SELECT MODE
Move the highlight bar (arrow) to your choice ("ON" or "OFF") by pressing **CH▲▼** or **SHUTTLE PLUS** △▽.

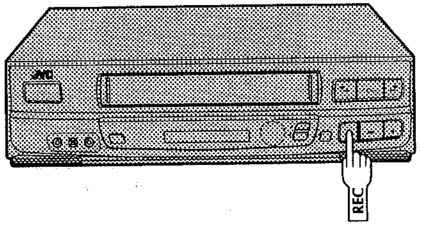

AUTO TIMER
ON
→ OFF
PRESS (▲,▼) TO SELECT
PRESS (MENU) TO END

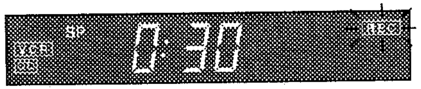
3
RETURN TO NORMAL SCREEN
Press **MENU** as many times as necessary.

NOTE:
For safety, when AUTO TIMER is set to "OFF", all other VCR functions are disabled while the Timer mode is engaged. To disengage the timer, press ***TIMER***.

Instant Timer Recording (ITR)

This easy method lets you record for from 30 minutes to 6 hours (selectable in 30-min. increments), and shuts the VCR off after recording is finished.





1 START RECORDING

Press **REC** on the front panel.

2 ENGAGE ITR MODE

Press **REC** again. REC blinks and 0:30 appears on the front display panel.

3 SET RECORDING DURATION

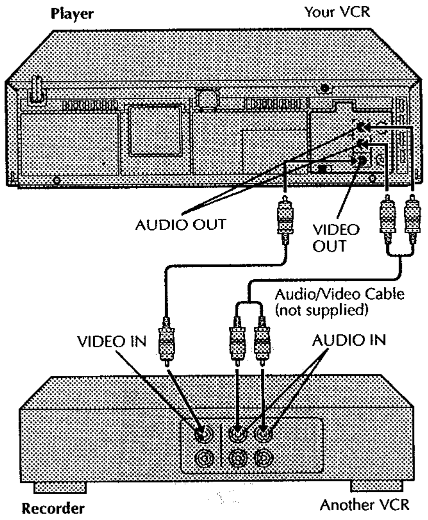
If you want to record for more than 30 minutes, press **REC** to extend the time. Each press extends recording time by 30 minutes.

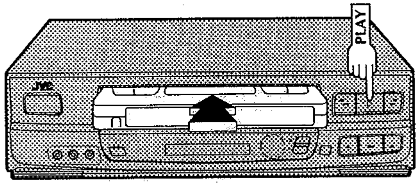
NOTES:

- *You can only perform ITR using the **REC** button on the VCR's front panel.*
- *After you set the ITR time, the previous display reappears.*
- *To check the remaining time, press **REC** once during recording and the remaining time will be displayed for about 5 seconds. Be careful not to press **REC** again within these 5 seconds, or you will round the recording time up to the next 30 minute increment.*

Edit To Another VCR

You can use your VCR as the player and another VCR as the recorder.





1 MAKE CONNECTIONS

Connect an AV cable between your VCR's VIDEO OUT and AUDIO OUT connectors and another VCR's VIDEO IN and AUDIO IN connectors.

For HR-J643U owners...

- When connecting to a monaural VCR, connect your VCR's AUDIO OUT L connector to the AUDIO IN connector on the monaural VCR.

For HR-J443U owners...

- When connecting to a Hi-Fi VCR, connect your VCR's AUDIO OUT connector to the AUDIO IN L connector on the Hi-Fi VCR.

2 LOAD CASSETTES

Insert the playback cassette into your VCR and the cassette to be recorded on into the other VCR.

3 SET RECORDER'S INPUT MODE

Set the other VCR's auxiliary (AV) input mode.

4 START PLAYER

Press **PLAY** on your VCR.

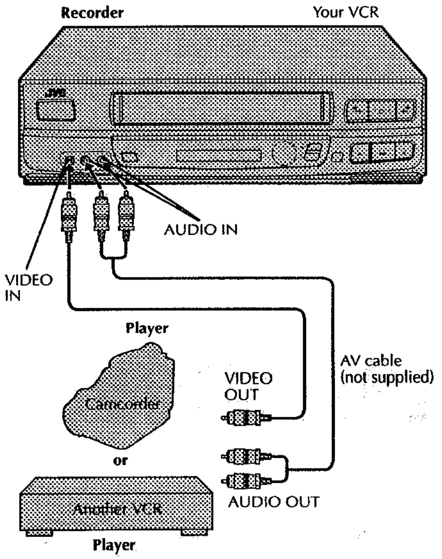
NOTE:

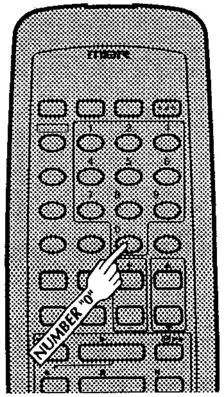
*If you don't want to record the superimposed indication on the edited tape, be sure to set "SUPERIMPOSE" to OFF before pressing **PLAY** (☞ pg. 20).*

5 START RECORDER

Set the other VCR to its record mode.

Edit From A Camcorder Or Another VCR





You can use a camcorder or another VCR as the player and your VCR as the recorder.

1 MAKE CONNECTIONS

Connect an AV cable between the camcorder's or the playback VCR's VIDEO OUT and AUDIO OUT connectors and your VCR's VIDEO IN and AUDIO IN connectors.

For HR-J643U owners...

- When using a monaural camcorder or a monaural VCR, connect its AUDIO OUT connector to the AUDIO IN L connector on your VCR.

For HR-J443U owners...

- When using a Hi-Fi camcorder or a Hi-Fi VCR, connect its AUDIO OUT L connector to the AUDIO IN connector on your VCR.

2 LOAD A CASSETTE

Insert the cassette to be recorded on into your VCR and the playback cassette into the camcorder or the playback VCR.

3 SET RECORDER'S INPUT MODE

Press **NUMBER** key "0" to set your VCR to AUX.

4 START PLAYER

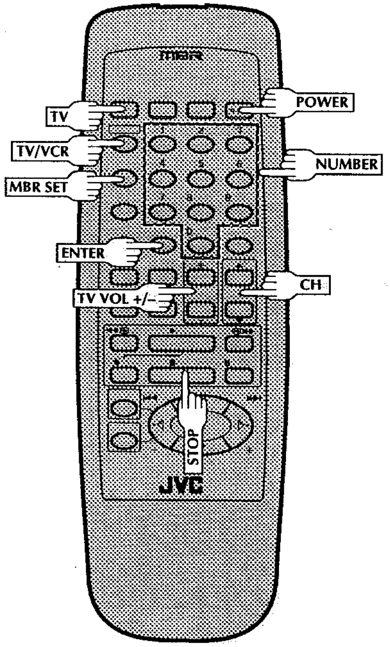
Set the camcorder or the playback VCR to its play mode.

NOTE:

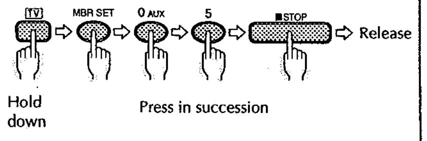
If the camcorder or another VCR is equipped with a superimpose/OSD disable feature then set its superimpose or display feature to OFF before pressing play.

5 START RECORDER

Set your VCR to its record mode.



(Ex.) To set remote control to RCA 05:



TV Multi-Brand Remote Control

The VCR's remote control can control several functions on JVC remote control TVs and on the brands of remote control TVs listed below. *The default setting is JVC code 01.

1 TURN ON THE TV

Turn the power on using the TV's remote control.

2 SET TV BRAND CODE

Refer to the chart below. While holding down **TV** on the VCR's remote control, press **MBR SET** and enter your TV's brand code using the **NUMBER** keys, then press **STOP**. Follow the example shown at bottom left.

- Once you have set the remote control to operate the TV, you don't have to repeat this step until you replace your remote control's batteries.
- PANASONIC has two codes. If the TV does not function with one code, try entering the other.

3 OPERATE TV

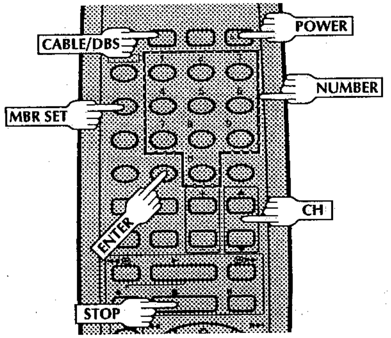
First, while holding down **TV**, press **POWER** on the remote to see if the TV's power goes off as it should. If it does, try other operations.

- The **POWER**, **TV/VCR**, **CH▲▼**, **TV VOL +/–** and **NUMBER** keys on the remote can all be used to operate the TV. *For some brands of TV, you must press **ENTER** after having pressed the **NUMBER** keys.
- To operate your TV, while holding down **TV**, press the corresponding button: **POWER**, **TV/VCR**, **CH▲▼**, **NUMBER** keys (or **ENTER**). **TV VOL +/–** can be used without holding down **TV**.

NOTE:

Depending on the type of TV, there may be cases where some or all functions cannot be operated using the remote control.

TV BRAND NAME	BRAND CODE
JVC	01
MAGNAVOX	02
MITSUBISHI	03
PANASONIC	04, 11
RCA	05
SHARP	06
SONY	07
TOSHIBA	08
ZENITH	09
HITACHI	10
SAMSUNG	12
SANYO	13
SEARS	13



DBS Receiver Multi-Brand Remote Control

The VCR's remote control can control functions on the brands of DBS (Direct Broadcast Satellite) receivers listed below.

1 TURN ON THE DBS RECEIVER

Turn the power on using the DBS receiver's remote control.

2 ENTER DBS RECEIVER BRAND

While holding down **CABLE/DBS** on the VCR's remote control, press **MBR SET** and use the **NUMBER** keys to enter the DBS receiver brand number from the chart below and then press **STOP**.
Follow the example shown at bottom right.

- Once you have set the remote control to operate the DBS receiver, you don't have to repeat this step until you replace the remote control's batteries.

3 OPERATE DBS RECEIVER

First, while hoding down **CABLE/DBS**, press **POWER** to see if the DBS receiver's power goes off as it should. If it does, try other functions.

- To operate your DBS Receiver, while holding down **CABLE/DBS**, press the corresponding button: **POWER, CH▲▼, NUMBER** keys (or **ENTER**).
- Depending on the DBS receiver you may have to press **ENTER** after having pressed the **NUMBER** keys.

NOTES:

- *Depending on the type of DBS receiver, there may be cases where some or all functions cannot be operated using the remote control.*
- *Though ECHOSTAR has a number of different remote codes, this remote control is applicable only to one of those codes preset at the factory.*

DBS BRAND NAME	BRAND CODE
RCA (DSS)	80
SONY (DSS)	81
PRIMESTAR	90
ECHOSTAR	91

Cable Box Multi-Brand Remote Control

The VCR's remote control can control functions on the brands of cable boxes listed below. Some cable box brands have more than one code. If your cable box does not function with a specified code, try other codes.

1 TURN ON THE CABLE BOX

Turn the power on using the cable box's remote control.

2 ENTER CABLE BOX BRAND

While holding down **CABLE/DBS** on the VCR's remote control, press **MBR SET** and use the **NUMBER** keys to enter the cable box brand number from the chart below and then press **STOP**.
Follow the example shown below.

- Once you have set the remote control to operate the cable box, you don't have to repeat this step until you replace the remote control's batteries.

3 OPERATE CABLE BOX

First, while holding down **CABLE/DBS**, press **POWER** to see if the cable box's power goes off as it should. If it does, try other functions.

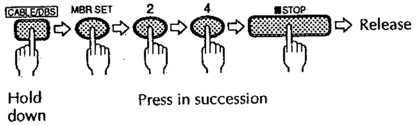
- To operate your cable box, while holding down **CABLE/DBS**, press the corresponding button: **POWER, CH▲▼, NUMBER** keys (or **ENTER**).
- For some brands of cable box, you must press **ENTER** after having pressed the **NUMBER** keys.

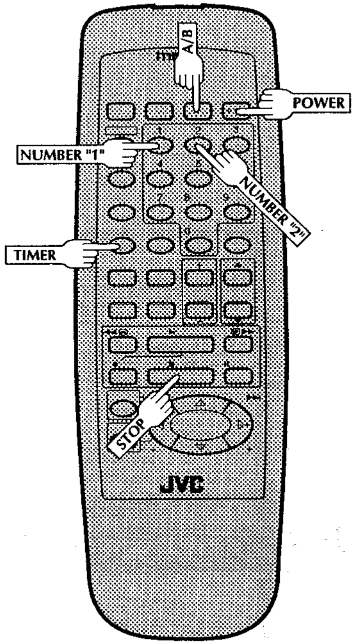
NOTE:

Depending on the type of cable box, there may be cases where some or all functions cannot be operated using the remote control.

CABLE BOX BRAND NAME	BRAND CODE
CURTIS	09, 10
GEMINI	08
GENERAL INSTRUMENTS	01, 02, 03, 04, 05, 06, 07, 08
HAMLIN	15, 16, 17, 18
JERROLD	01, 02, 03, 04, 05, 06, 07, 08
OAK	19, 20, 21
PANASONIC	24, 25, 26
PIONEER	13, 14
RCA	24, 25, 26
REGAL	15, 16, 17, 18
SAMSUNG	08, 13
SCIENTIFIC ATLANTA	09, 10
SIGMA	19, 20, 21
SL MARX	08, 13
SPRUCER	24, 25, 26
TELEVIEW	08, 13
TOCOM	22, 23
VIDEOWAY	11, 12
ZENITH	11, 12

(Ex.) To set remote control to cable box brand RCA 24:





Child Lock

This feature allows you to prevent the operation of the VCR.

1 TURN VCR POWER ON

Press **POWER**.

2 ENGAGE CHILD LOCK

Press and hold **POWER** on the remote control until the Child Lock indicator ("—") appears on the front display panel.

- Power turns OFF and the VCR cannot be turned on from the **POWER** button on the front panel.
- To cancel Child Lock, press and hold **POWER** on the remote to turn the VCR on. During timer recording, pressing **TIMER** also cancels Child Lock.

NOTES:

- *When Child Lock is engaged, make sure to keep the remote control out of the reach of children.*
- *Timer recording of programs that were previously set can be performed while the Child Lock is engaged. The feature remains in effect after the recording is finished.*

Control Two JVC VCRs

The remote control is capable of controlling two JVC VCRs independently; one set to respond to your remote control's **A** code control signals and another set to respond to **B** code control signals. The remote control is preset to send **A** code signals because your VCR is initially set to respond to **A** code signals. You can easily modify your VCR to respond to **B** code signals.

1 UNPLUG VCR'S POWER CORD

Unplug from the AC outlet.

2 SET REMOTE CONTROL CODE

While holding down **A/B** on the remote control, press the **NUMBER** key "2" and then press **STOP**.

3 PLUG IN POWER CORD

Plug back in to the AC outlet.

4 TURN VCR POWER ON

Press **POWER** on the remote.

The VCR will now respond only to B-code commands.
To set the VCR back to respond to A code signals, repeat the same procedure as shown above except pressing **NUMBER** key "1" instead of "2" in step **2**.
You can control two VCRs with the same remote control by switching the remote's code between A and B.

Before requesting service for a problem, use this chart and see if you can repair the trouble yourself. Small problems are often easily corrected, and this can save you the trouble of sending your VCR off for repair.

POWER

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
1. The power won't come on.	• The power cord is disconnected.	Connect the power cord.
2. The clock works, but the VCR's power won't come on.	• The TIMER mode is engaged with Auto Timer set to "OFF" (☞ pg. 31). • The Child Lock mode is engaged.	Press **TIMER** to disengage. Press and hold **POWER** on the remote to disengage the mode (☞ p. 37).
3. The remote control won't function.	• The batteries are discharged.	Replace the dead batteries with new ones.

TAPE TRANSPORT

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
1. The cassette gets stuck partway during loading, and is ejected.	• The cassette was inserted incorrectly.	Make sure the window side is up, the rear label side is facing you and the arrow on the front of the cassette is pointing towards the VCR. Then insert the cassette.
2. The tape stops during rewind or fast forward.	• The Counter Memory indicator ("M") is lit on the front display panel.	Press **C.MEMORY** to disengage the Counter Memory mode and extinguish the indicator.

PLAYBACK

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
1. The tape is running but the picture won't appear.	• If you're using the RF OUT connection (☞ pg. 6), the channel selector on the TV is set incorrectly. • If you're using the AV connection (☞ pg. 6), the TV receiver is set to the wrong mode.	Set the channel selector to channel 3 or 4. Set the TV receiver to its AV mode.
2. Noise appears during visual search.	• This is normal.	
3. (HR-J643U only) Breaks are noticeable in Hi-Fi soundtrack.	• Automatic tracking is engaged.	Engage and adjust tracking manually (☞ pg. 18).
4. The playback picture is blurred or interrupted, even though TV broadcasts are clear.	• The video heads may be dirty.	The heads must be cleaned. Consult your JVC dealer.
5. (HR-J643U Only) The Hi-Fi soundtrack cannot be heard.	• The AUDIO MONITOR option at the Function Set screen was set incorrectly.	Set AUDIO MONITOR to "HI-FI" (☞ pg. 21).

RECORDING

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
1. Recording won't start.	• There's no cassette loaded. • The loaded cassette has had its record safety tab removed.	Insert a cassette. Remove the cassette and cover the hole with adhesive tape, or load a cassette on which the record safety tab is intact.
2. TV broadcasts won't record properly.	• The VCR has been set to its AUX mode by mistake.	Set the VCR to the appropriate channel.
3. Tape-to-tape editing won't work.	• The VCRs or the camcorder and the VCR have been incorrectly connected. • The power to one or more of the units has not been turned on. • The recorder has not been set to its AUX mode.	Refer to the directions and the illustration under "Edit To Another VCR" (☞ pg. 33) or "Edit From A Camcorder Or Another VCR" (☞ pg. 34) and properly connect the units. Make sure the power to all units is on. Set the recorder to its AUX mode.

TIMER RECORDING

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
1. Timer recording won't work.	• The clock and/or the timer have been set incorrectly. • The timer is not engaged. • The VCR has not been set up properly.	Set the clock and/or timer correctly. Press **TIMER** and check to make sure that TIMER appears on the front display panel. Re-perform the set-up procedures.
2. On-screen timer programming won't work.	• Timer recording is in progress.	Timer programming can't be performed when timer recording is in progress. Wait until it finishes.
3. TIMER and 📼 on the front display panel won't stop blinking.	• The timer is engaged but there's no cassette loaded. • The loaded cassette has had its record safety tab removed.	Load a cassette with the record safety tab intact, or with the hole covered with adhesive tape. Press **TIMER** so that TIMER on the display panel disappears, then eject the cassette and cover its hole with adhesive tape, or replace it with a cassette on which the safety tab is intact.
4. TIMER blinks for 10 seconds and the timer mode is disengaged.	• **TIMER** has been pressed when there are no programs in memory, or the timer record program information has not been programmed correctly.	Check the programmed data and re-program as necessary, then press **TIMER** again.
5. The cassette is automatically ejected, the power shuts off and TIMER and 📼 won't stop blinking.	• The end of tape was reached during timer recording.	The program may not have been recorded in its entirety. Next time make sure you have enough time on the tape to record the entire program.

OTHER PROBLEMS

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
1. When scanning channels, some of them are skipped over.	• Those channels have been preset to be skipped.	If you need the skipped channels, restore them (☞ pg. 14).
2. The channel can't be changed.	• Recording is in progress.	Press **PAUSE** to pause the recording, change channels, then press **PLAY** to resume recording.
3. The remote control won't operate my TV or cable box or DBS receiver.	• The remote control brand setting is incorrect.	Re-set the remote control to the correct brand (☞ pg. 35 or 36).
4. Even though Auto or Semi-Auto clock setting has been selected, the clock is incorrect.	• The clock setting data received from the Host Channel is incorrect.	Select a different Host Channel during the Semi-Auto setting procedure (☞ pg. 10), or perform the Manual setting procedure (☞ pg. 11).

ATTENTION:
This VCR contains microcomputers. External electronic noise or interference can cause microcomputer to malfunction. If the VCR does not operate correctly switch its power off and unplug the power cord from the AC supply. Wait for a while and then plug the power back in. Eject and check the condition of the cassette. If everything appears normal resume operating the VCR as usual.

PLAYBACK

Q. What happens if the end of the tape is reached during playback or search?
A. The tape is automatically rewound to the beginning.

Q. Can the VCR indefinitely remain in the still mode?
A. No. It stops automatically after 5 minutes to protect the heads.

Q. During search, slow, still and frame-by-frame playback, I can't hear any audio. What's the problem?
A. This is normal.

Q. During search, still and frame-by-frame playback, the picture is intermittent. What's the cause?
A. Picture loss occurs when these types of playback are attempted with a tape recorded in LP mode. Pressing **PLAY** to return to normal playback will restore the picture.

Q. When returning from multi-speed search to normal playback, the picture is disturbed. Should I be concerned about this?
A. No, it is normal.

Q. Noise bars appear during multi-speed search. What's the problem?
A. This is normal.

Q. When playing back programs that have been timer-recorded with consecutive times (such one program from 8:00 to 9:00 and another one from 9:00 to 10:00), the picture becomes momentarily distorted at the point where the first program ends and the second program begins. Is this a malfunction?
A. No. This is normal.

Q. Other than preventing further recording, what effect does removing the safety tab have?
A. It disables marking of index codes.

Q. Sometimes, during Index Search, the VCR can't find the program I want to see. Why not?
A. There may be index codes too close together.

Q. During playback, on-screen operational indicators sometimes jitter. Why does this happen?
A. If the condition of the tape being played back is not good, jittering of the video (including on-screen indicators) may occur.

RECORDING

Q. When I pause and then resume a recording, the end of the recording before the pause is overlapped by the new recording. Why does this happen?
A. This is normal. It reduces distortion at the pause and resume points.

Q. Can the VCR indefinitely remain in the Record-Pause mode?
A. No. The VCR automatically goes to its Stop mode after 5 minutes to protect the heads. When paused during Instant Timer Recording (ITR), the VCR shuts off automatically after 5 minutes.

Q. What happens if the tape runs out during recording?
A. The VCR automatically rewinds it to the beginning.

TIMER RECORDING

Q. REC and TIMER remain lit on the front display panel. Is there a problem?
A. No. This is a normal condition for a timer recording in progress.

Q. Can I program the timer while I'm watching a tape or a TV broadcast?
A. Yes, but while you are setting the timer you won't see the tape's or broadcast program's picture as it is replaced by the on-screen menu. The audio from the tape or broadcast program will be present during the setting of the timer.

List Of Terms

This guide serves as a quick way to locate frequently used terms and on-screen display names.

A
A/B Code 37
Active Video Calibration 24
Add Channel 14
AFC 14
Audio Monitor 21
Auto Channel Setting 13
Auto Clock Setting 11
Auto Daylight Saving Time 11
Auto Timer 31
Automatic Tracking 18
Aux Input 34
AV Connection 6

B
Band 12

C
Cancel Program 30
Cassette Adapter 15
Check Program 30
Child Lock 37
Connection to TV 6
Contents 5
Counter Memory 23
Counter Reset 23

D
Delete Channel 14

E
Editing 33

F
Frame-by-Frame Playback 17
Function Setting 20

H
Host Channel Selection 10

I
Index Search 22
Insert Cassette 15
Instant ReView 22
ITR (Instant Timer Recording) 32

L
Language Selection 8

M
Main Menu 8
Manual Channel Setting 14
Manual Clock Setting 11
Manual Tracking 18
MBR (Multi-Brand Remote) Code Setting 35

N
Next-Function Memory 23

O
On-Screen Display 20
On-Screen Timer Programming 28
On-Screen Timer Recording 28
Override Auto Clock Setting 9

P
PBS Channel 7
Playback 15
Plug & Play 7

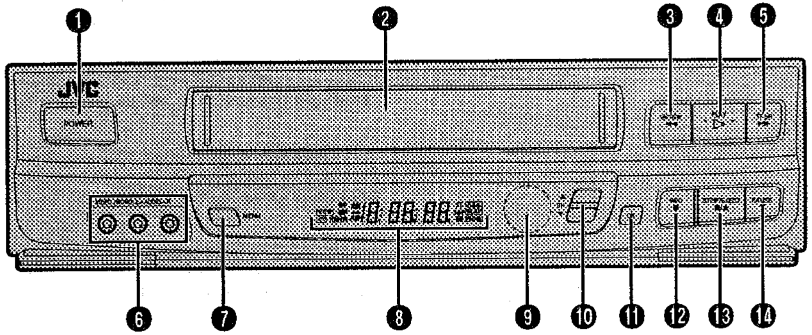
R
Record Safety Tab 16
Recording 16
Repeat Playback 23
Reverse Motion Playback 17
Reverse Slow Motion Playback 17
RF Connection 6

S
SAP (Second Audio Program) 27
Second Audio 27
Semi-Auto Clock Setting 10
Skip Search 22
Slow Motion Playback 17
Specifications 45
Still Picture Playback 17
Superimpose 20

T
Tape Position Indicator 18
Tape Speed Setting 16
Time Zone Selection 11
Tuner Setting 12

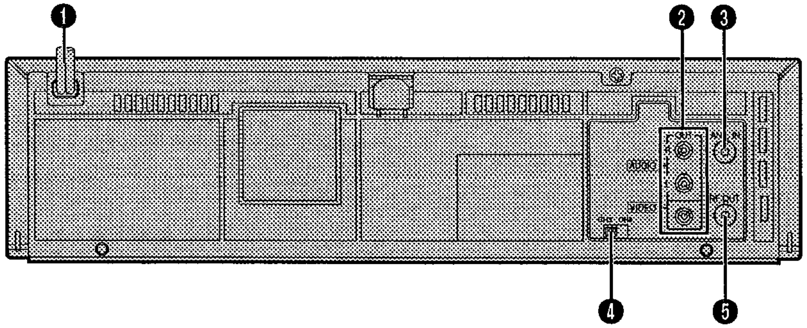
V
Variable-Speed Search 17
Video Stabilizer 19

FRONT VIEW



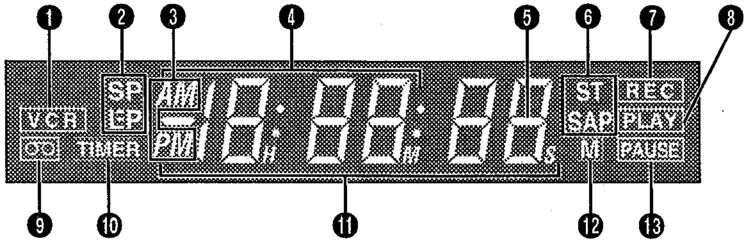
① Power On/Off Button (☞ pg. 8)
② Cassette Loading Slot
③ Rewind [REW] Button (☞ pg. 15)
④ PLAY Button (☞ pg. 15)
⑤ Fast-Forward [FF] Button (☞ pg. 15)
⑥ VIDEO/AUDIO Input Connectors (☞ pg. 34)
  * The HR-J443U has only one AUDIO input connector.
⑦ MENU Button (☞ pg. 8)
⑧ Front Display Panel (☞ pg. 43)
⑨ Remote Control Sensor
⑩ Channel [CH] ▲▼ Button (☞ pg. 16)
⑪ OK Button (☞ pg. 8)
⑫ Record [REC] Button (☞ pg. 16)
⑬ STOP/EJECT Button (☞ pg. 15)
⑭ PAUSE Button (☞ pg. 17)

REAR VIEW



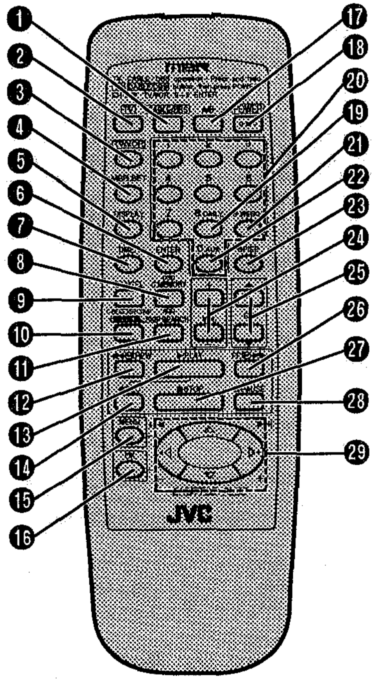
① Power Cord (☞ pg. 6)
② VIDEO/AUDIO Output Connectors (☞ pg. 33)
  * The HR-J443U has only one AUDIO output connector.
③ ANT. IN Connector (☞ pg. 6)
④ Channel 3/4 Switch (☞ pg. 6)
⑤ RF OUT Connector (☞ pg. 6)

FRONT DISPLAY PANEL



① VCR Mode Indicator (☞ pg. 26)
② Tape Speed Indicators (☞ pg. 16)
③ AM/PM Indicators (☞ pg. 7)
④ Clock Display (☞ pg. 7)
⑤ Child Lock Indicator (☞ pg. 37)
⑥ Multi-Channel TV Sound Indicators (☞ pg. 27) [HR-J643U Only]
⑦ Recording Mode Indicator (☞ pg. 16)
  Instant Timer Recording Indicator (☞ pg. 32)
⑧ Play Mode Indicator
⑨ "Cassette Loaded" Mark
⑩ Timer Mode Indicator
⑪ Channel Display ["AU" for AUX mode]
  Counter Display (☞ pg. 15)
⑫ Counter Memory Mark (☞ pg. 23)
⑬ Pause Mode Indicator

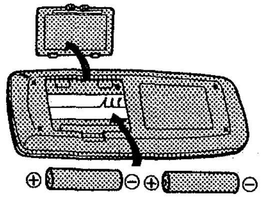
REMOTE CONTROL



① CABLE/DBS Button (☞ pg. 36)
② TV Button (☞ pg. 35)
③ TV/VCR Button (☞ pg. 26)
④ MBR SET Button (☞ pg. 35)
⑤ DISPLAY Button (☞ pg. 23)
⑥ ENTER Button (☞ pg. 16)
On-Screen Display [OSD] Button (☞ pg. 20)
⑦ TIMER Button (☞ pg. 29)
⑧ Counter [C.] MEMORY Button (☞ pg. 23)
ADD Button (☞ pg. 14)
⑨ CANCEL Button (☞ pg. 30)
Channel [CH] SKIP Button (☞ pg. 14)
Counter [C.] RESET Button (☞ pg. 23)
⑩ Instant REVIEW Button (☞ pg. 22)
⑪ SKIP SEARCH Button (☞ pg. 22)
⑫ Rewind [REW] Button (☞ pg. 15)
⑬ PLAY Button (☞ pg. 15)
⑭ Record [REC] Button (☞ pg. 16)
⑮ MENU Button (☞ pg. 8)
⑯ OK Button (☞ pg. 8)
⑰ A/B Code Button (☞ pg. 37)
⑱ POWER On/Off Button (☞ pg. 8)
⑲ DAILY Timer Recording Button (☞ pg. 28)
⑳ NUMBER Buttons (☞ pg. 16)
㉑ WEEKLY Timer Recording Button (☞ pg. 28)
㉒ "AUX" Mode Select Button (☞ pg. 34)
㉓ Recording Speed [SP/EP] Button (☞ pg. 16)
㉔ TV Volume [VOL] +/– Button (☞ pg. 35)
㉕ Channel [CH] ▲▼ Button (☞ pg. 16)
㉖ Fast-Foward [FF] Button (☞ pg. 15)
㉗ STOP Button (☞ pg. 15)
㉘ PAUSE Button (☞ pg. 17)
㉙ SHUTTLE PLUS Button (☞ pg. 8)

Installing Batteries

1. Open the battery compartment cover.
2. Insert 2 "AA"-size batteries (provided) in the direction indicated under the battery cover.
3. Replace the cover.



How To Use

The remote control can operate most of your VCR's functions.

1. Point the remote control toward the sensor window.
2. Press the appropriate operation button.
3. The maximum operating distance of the remote control is about 8 m.

NOTES:

- *This remote control can also operate various brands of TVs, Cable Boxes and DBS Receivers. For instructions, ☞ pg. 35, 36.*
- *If the remote control doesn't work properly, remove its batteries, wait a short time, replace the batteries and then try again.*

GENERAL

Power requirement	: AC 120 V∿
Power consumption	: 21 W (HR-J643U) : 19 W (HR-J443U)
Temperature	
Operating	: 5°C to 40°C (41°F to 104°F)
Storage	: –20°C to 60°C (–4°F to140°F)
Operating position	: Horizontal only
Dimensions (W x H x D)	: 360 x 94 x 276 mm (14-3/16" x 3-3/4" x 10 -7/8")
Weight	: 3.4 kg (7.5 lbs)
Format	: VHS NTSC standard
Maximum recording time	
SP	: 210 min. with ST-210 video cassette
EP	: 630 min. with ST-210 video cassette

VIDEO/AUDIO

Signal system	: NTSC-type color signal and EIA monochrome signal, 525 lines/60 fields
Recording/ Playback system	: DA-4 (Double Azimuth) head helical scan system
Signal-to-noise ratio	: 45 dB
Horizontal resolution	: 240 lines
Frequency range	
Normal audio	: 70 Hz to 10,000 Hz
Hi-Fi audio (HR-J643U Only)	: 20 Hz to 20,000 Hz
Input/Output	: RCA connectors (IN x 1, OUT x 1)

TUNER

Tuning system	: Frequency-synthesized tuner
Channel coverage	
VHF	: Channels 2–13
UHF	: Channels 14–69
CATV	: 113 Channels
RF output	: Channel 3 or 4 (switchable; preset to Channel 3 when shipped) 75 ohms, unbalanced

TIMER

Clock reference	: Quartz
Program capacity	: 1-year programmable timer/ 8 programs
Memory backup time	: Approx. 10 min.

ACCESSORIES

Provided accessories	: RF cable (F-type), Infrared remote control unit, "AA" battery x 2

E. & O.E. Design and specifications subject to change without notice.

HOW TO LOCATE YOUR JVC SERVICE CENTER

TOLL FREE: 1-800-252-5722

Dear customer:

In order to receive the most satisfaction from your purchase, read the instruction booklet before operating the unit. In the event that repair is necessary, or for the address nearest your location, please refer to the factory service center list below or within the Continental United States, call 1-800-252-5722 for your authorized servicer. Remember to retain your Bill of Sale for Warranty Service.

— JVC

JVC SERVICE & ENGINEERING COMPANY OF AMERICA

DIVISION OF US JVC CORP.

FACTORY SERVICE CENTER LOCATIONS

107 Little Falls Road
Fairfield, NJ 07004-2105
(201) 808-9279

5665 Corporate Avenue
Cypress, CA 90630-4727
(714) 229-8011

230 Eliot Street
Ashland, MA 01721-2377
(508) 881-5923

1500 Lakes Parkway
Lawrenceville, GA 30243-5857
(770) 339-2522

10700 Hammerly Boulevard, Suite 110
Houston, TX 77043-2310
(713) 935-9331

8192 W State Road 84
Davie, FL 33324-4611
(954) 472-1960

705 Enterprise Street
Aurora, IL 60504-8135
(630) 851-7855

2969 Mapunapuna Place, Suite 101
Honolulu, HI 96819-2000
(808) 833-5828

890 Dubuque Avenue
South San Francisco, CA 94080-1804
(415) 871-2666

Sophisticated electronic products may require occasional service. Just as quality is a keyword in the engineering and production of the wide array of JVC products, service is the key to maintaining the high level performance for which JVC is world famous. The JVC service and engineering organization stands behind our products.

NATIONAL HEADQUARTERS
JVC SERVICE & ENGINEERING COMPANY OF AMERICA
DIVISION OF US JVC CORP.
107 Little Falls Road
Fairfield, NJ 07004-2105

If you ship the product...

Pack your JVC unit in the original carton or one of equivalent size and strength. Enclose, with the unit, a letter stating the problem or symptom that exists and also a copy of the receipt or bill of sale you received when you purchased your JVC unit. Print your home return address on the outside and the inside of the carton. Send to the appropriate JVC Factory Service Center as listed above.

ACCESSORIES

To purchase accessories for your JVC product, you may contact your local JVC Dealer.
Or from the 48 Continental United States call toll free:
1-800-882-2345.

Don't service it yourself.

CAUTION

To prevent electrical shock, do not open the cabinet. No user serviceable parts inside.
Refer servicing to qualified service personnel.

LIMITED WARRANTY

CONSUMER VIDEO 1-90

JVC COMPANY OF AMERICA warrants this product and all parts thereof, except as set forth below ONLY TO THE ORIGINAL PURCHASER AT RETAIL to be FREE FROM DEFECTIVE MATERIALS AND WORKMANSHIP from the date of original retail purchase for the period as shown below. ("The Warranty Period")

PARTS	LABOR
1 YR	90 DAYS

THIS LIMITED WARRANTY IS VALID ONLY IN THE FIFTY (50) UNITED STATES, THE DISTRICT OF COLUMBIA AND IN COMMONWEALTH OF PUERTO RICO.

WHAT WE WILL DO:
If this product is found to be defective, JVC will repair or replace defective parts at no charge to the original owner. Such repair and replacement services shall be rendered by JVC during normal business hours at JVC authorized service centers. Parts used for replacement are warranted only for the remainder of the Warranty Period. All products and parts thereof may be brought to a JVC authorized service center on a carry-in basis except for Television sets having a screen size 25 inches and above which are covered on an in-home basis.

WHAT YOU MUST DO FOR WARRANTY SERVICE:
Return your product to a JVC authorized service center with a copy of your bill of sale. For your nearest JVC authorized service center, please call toll free: (800) 252-5722.

If service is not available locally, box the product carefully, preferably in the original carton, and ship, insured, with a copy of your bill of sale plus a letter of explanation of the problem to the nearest JVC Factory Service Center, the name and location of which will be given to you by the toll-free number.

If you have any questions concerning your JVC Product, please contact our Customer Relations Department.

WHAT IS NOT COVERED:
This limited warranty provided by JVC does not cover:

1. Products which have been subject to abuse, accident, alteration, modification, tampering, negligence, misuse, faulty installation, lack of reasonable care, or if repaired or serviced by anyone other than a service facility authorized by JVC to render such service, or if affixed to any attachment not provided with the products, or if the model or serial number has been altered, tampered with, defaced or removed;
2. Initial installation and installation and removal for repair;
3. Operational adjustments covered in the Owner's Manual, normal maintenance, video and audio head cleaning;
4. Damage that occurs in shipment, due to act of God, and cosmetic damage;
5. Signal reception problems and failures due to line power surge;
6. Video Pick-up Tubes/CCD Image Sensor, Cartridge, Stylus (Needle) are covered for 90 days from the date of purchase;
7. Accessories;
8. Batteries (except that Rechargeable Batteries are covered for 90 days from the date of purchase); from the date of purchase);

There are no other express warranties except as listed above.

THE DURATION OF ANY IMPLIED WARRANTIES INCLUDING THE IMPLIED WARRANTY OF MERCHANTABILITY, IS LIMITED TO THE DURATION OF THE EXPRESS WARRANTY HEREIN.

JVC SHALL NOT BE LIABLE FOR THE LOSS OF USE OF THE PRODUCT, INCONVENIENCE, LOSS OR ANY OTHER DAMAGES, WHETHER DIRECT, INCIDENTAL OR CONSEQUENTIAL (INCLUDING, WITHOUT LIMITATION, DAMAGE TO TAPES, RECORDS OR DISCS) RESULTING FROM THE USE OF THIS PRODUCT, OR ARISING OUT OF ANY BREACH OF THIS WARRANTY. ALL EXPRESS AND IMPLIED WARRANTIES, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSE, ARE LIMITED TO THE WARRANTY PERIOD SET FORTH ABOVE.

Some states do not allow the exclusion of incidental or consequential dameges or limitations on how long an implied warranty lasts, so these limitations or exclusions may not apply to you. This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

JVC COMPANY OF AMERICA
DIVISION OF US JVC CORP.
41 Slater Drive
Elmwood Park, New Jersey 07407

REFURBISHED PRODUCTS CARRY A SEPARATE WARRANTY, THIS WARRANTY DOES NOT APPLY. FOR DETAILS OF REFURBISHED PRODUCT WARRANTY, PLEASE REFER TO THE REFURBISHED PRODUCT WARRANTY INFORMATION PACKAGED WITH EACH REFURBISHED PRODUCT.

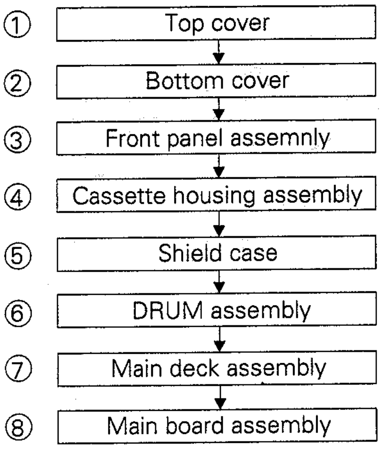
For customer use:
Enter below the Model No. and Serial No. which is located either on the rear, bottom or side of the cabinet. Retain this information for future reference.

Model No.: ____________________
Serial No.: ____________________
Purchase date: ____________________
Name of dealer: ____________________

SECTION 1
DISASSEMBLY

1.1 DISASSEMBLY FLOW CHART

This flowchart lists the disassembling steps for the cabinet parts and P.C. boards in order to gain access to item(s) to be serviced. When reassembling, perform the step(s) in reverse order. Bend, route and dress the flat cables as they were originally laid.



1.2 HOW TO READ THE DISASSEMBLY AND ASSEMBLY

STEP /LOC NO.	PART NAME	FIG. NO.	POINT	NOTE
①	TOP COVER	D1	3(S1)	
②	BOTTOM COVER	D2	2(L1),3(L2),7(L3)	<NOTE 1>
③	FRONT PANEL ASSEMBLY	D3	7(L4)	<NOTE 2>
④	CASSETTE HOUSING ASSEMBLY	D4	2(S2),2(S3)	<NOTE 3>
⑤	SHIELD CASE	D5	2(S4), *CN1	
⑥	DRUM ASSEMBLY	D6	3(S5),WR1	<NOTE 4>
⑦	MAIN DECK ASSEMBLY	D7	2(S6),WR2,WR3, WR4(CN703),2(L5)	<NOTE 5>
⑧	MAIN BOARD ASSEMBLY	D8	4(L6), 4(S7)	

↑ (1) ↑ (2) ↑ (3) ↑ (4) ↑ (5)

(1) Order of steps in Procedure
When reassembling, perform the step(s) in the reverse order. These numbers are also used as the identification (location) NO. of parts Figures.
(2) Part name to be removed or installed.
(3) Fig.No. showing procedure or part location
(4) Indentification of part to be removed,unhooked,unlocked, released,unpluged,unclamped or unsoldered. P = Spring, W = Washer, S = Screw, L = Locking tab, * = Unhook,unlock, release,unplug or unsolder.
(5) Adjustment information for installation

1.3 DISASSEMBLY/ASSEMBLY METHOD

STEP /LOC NO.	PART NAME	FIG. NO.	POINT	NOTE
①	TOP COVER	D1	3(S1)	
②	BOTTOM COVER	D2	2(L1),3(L2),7(L3)	<NOTE1>
③	FRONT PANEL ASSEMBLY	D3	7(L4)	<NOTE2>
④	CASSETTE HOUSING ASSEMBLY	D4	2(S2), 2(S3)	<NOTE3>
⑤	SHIELD CASE	D5	2(S4), *CN1	
⑥	DRUM ASSEMBLY	D6	3(S5),WR1	<NOTE4>
⑦	MAIN DECK ASSEMBLY	D7	2(S6),WR2,WR3, WR4,*CN703,2(L5)	<NOTE5>
⑧	MAIN BOARD ASSEMBLY	D8	3(L6), 4(S7)	

<NOTE1>
Loosen the 3 screws (Mark : ➡) first, then remove the bottom cover.

<NOTE2>
When reattaching the front panel assembly, make sure that the door opener of the cassette housing assembly is lowered in position prior to the reinstallation.

<NOTE3>
When reattaching the cassette housing assembly, pay careful attention to the switch lever not to make it touch the REC switch knob of the MAIN board assembly from the upside. (If the REC switch knob of the MAIN board assembly is damaged, cassette loading is impossible.)

<NOTE4>
When plugging the connector in, check that the flat wire is inserted properly and fully.

<NOTE5>
- When removing the Main deck assembly only, unhook the two spacers connecting it with the Main board assembly with pliers from the back side of the Main board assembly first, and then remove the Main deck assembly.
- When reattaching the Main deck assembly to the Main board assembly, make sure to set the spacers into the retaining slots respectively.

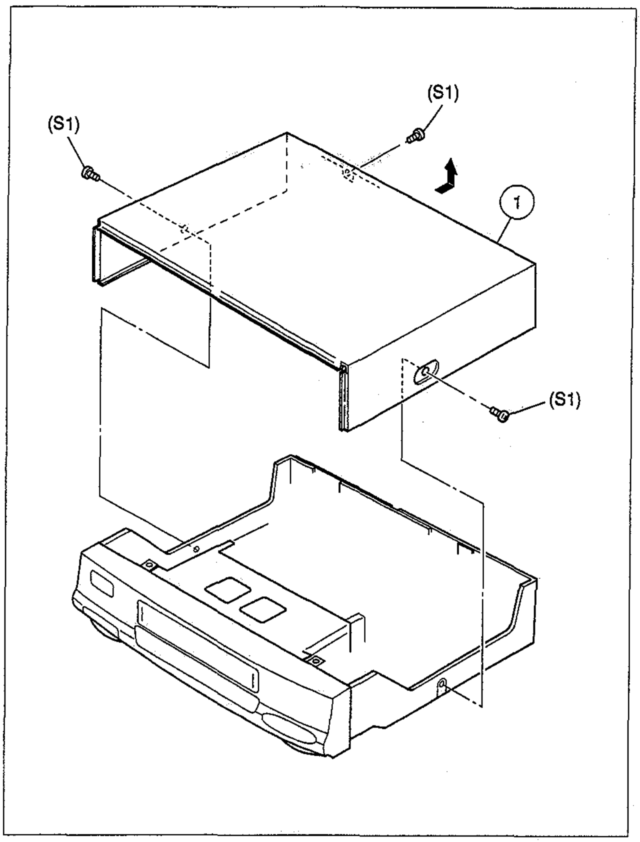


Fig. D1

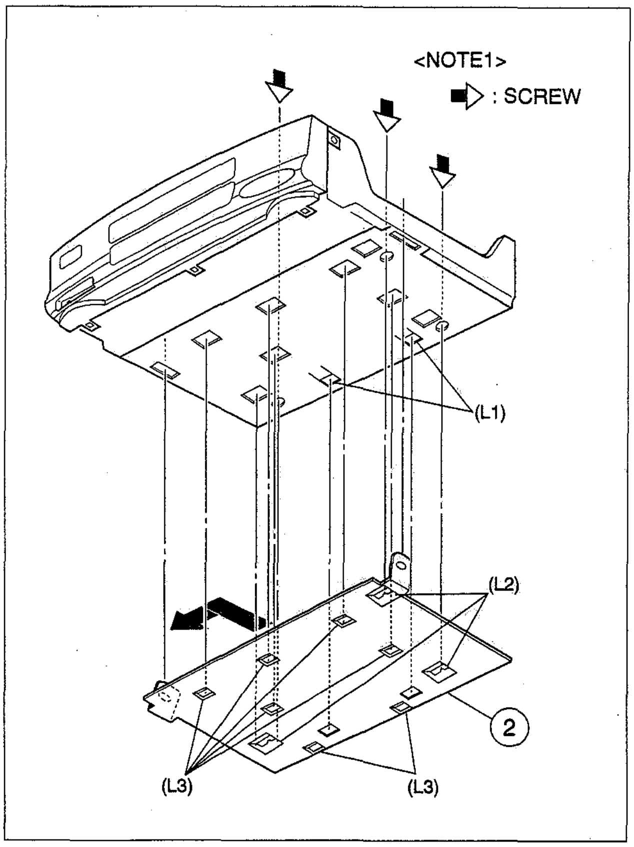

<NOTE1>
: SCREW
(L1)
(L2)
2
(L3)
(L3)

Fig. D2

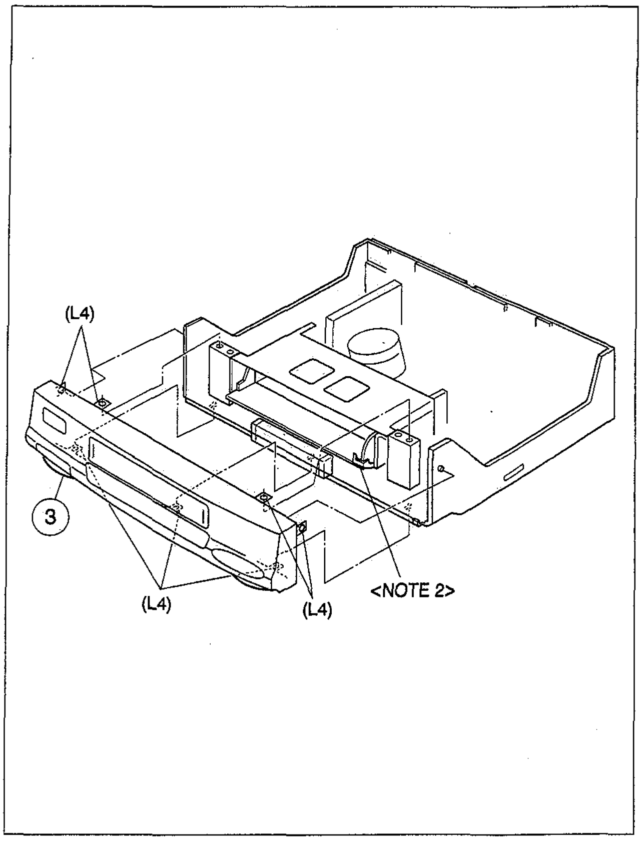


Fig. D3

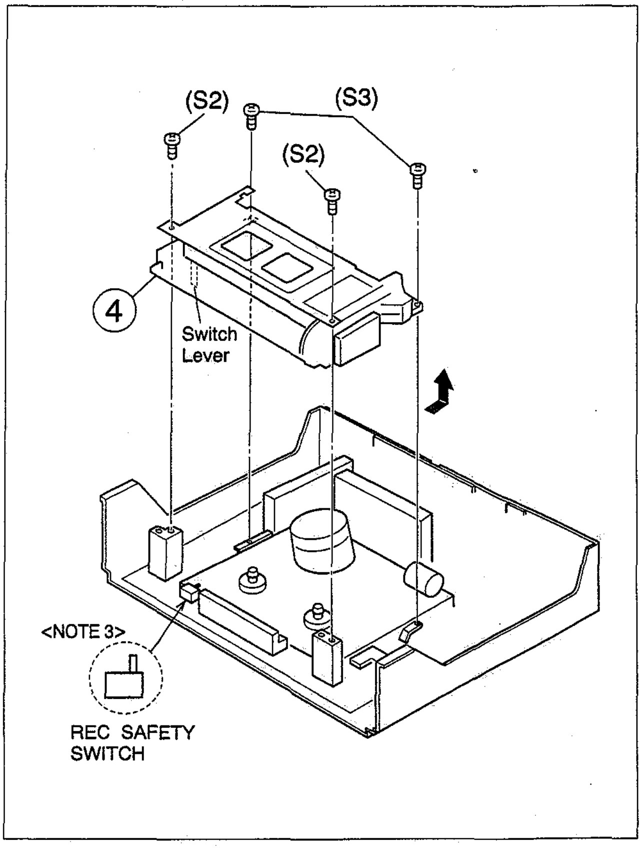

(S2)
(S3)
(S2)
4
Switch Lever
<NOTE 3>
REC SAFETY SWITCH

Fig. D4

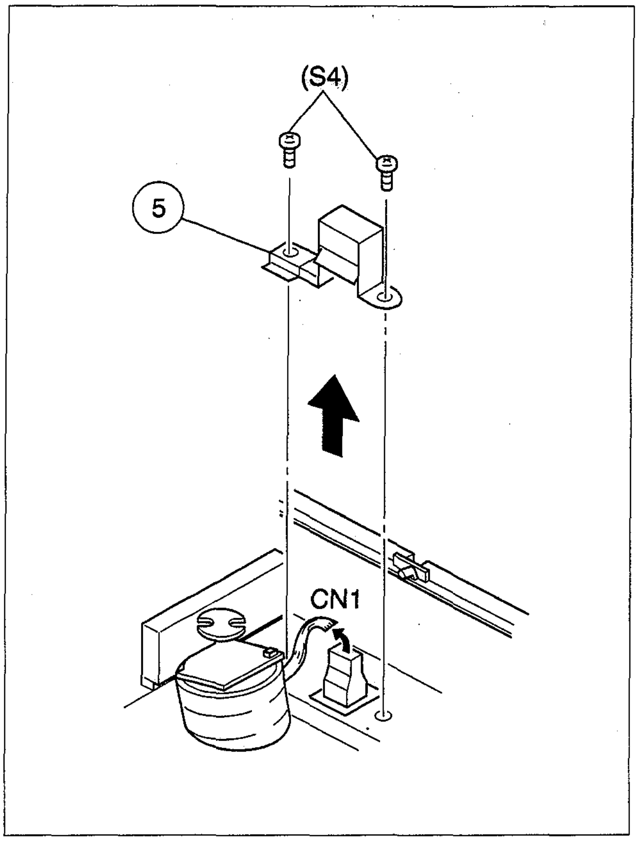


Fig. D5

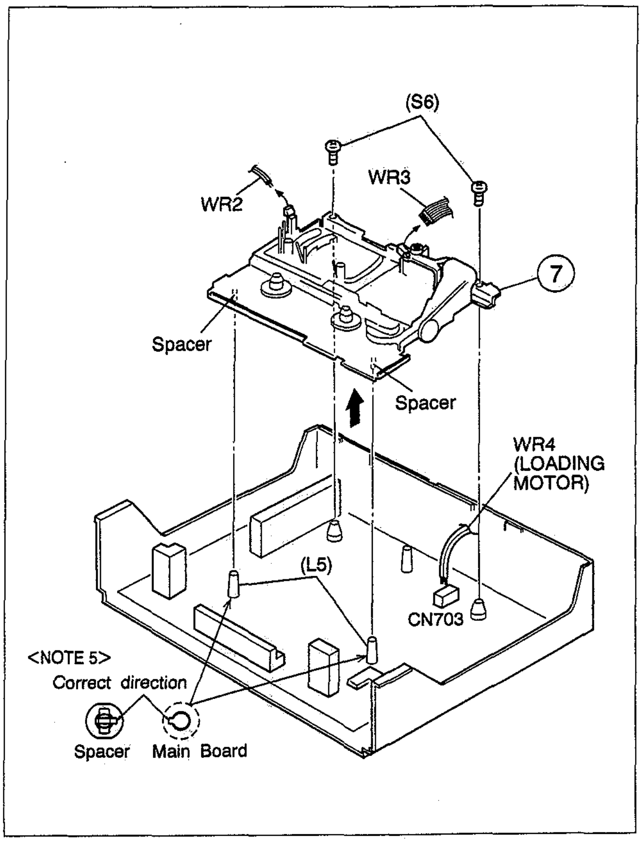

(S6)
WR2
WR3
7
Spacer
Spacer
WR4
(LOADING
MOTOR)
(L5)
CN703
<NOTE 5>
Correct direction
Spacer
Main Board

Fig. D7

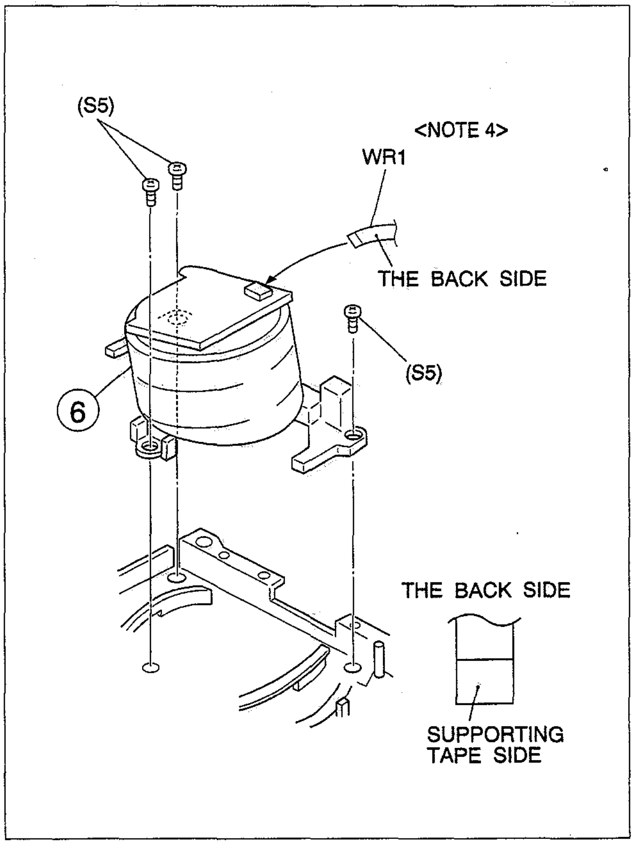

(S5)
<NOTE 4>
WR1
THE BACK SIDE
(S5)
6
THE BACK SIDE
SUPPORTING
TAPE SIDE

Fig. D6

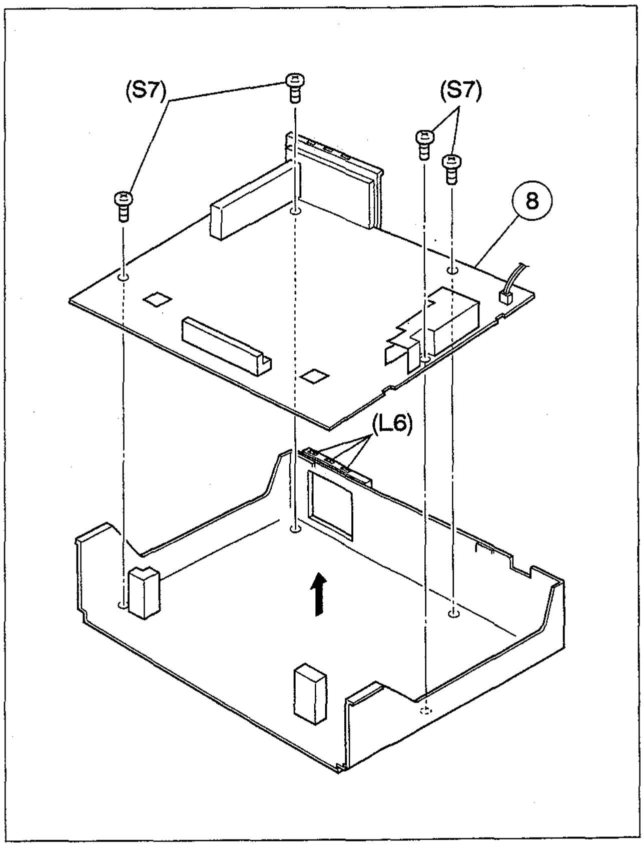


Fig. D8

1.4 CASSETTE HOUSING INSTALLATION

NOTE: *Observe the mechanical phase and position (see figure) when installing the cassette housing assembly. If these are incorrect, the system will not operate properly even when tape is inserted.*

(1) Check that the hole of the control cam are aligned to the deck hole. If necessary, turn the loading motor belt by hand to adjust the position.

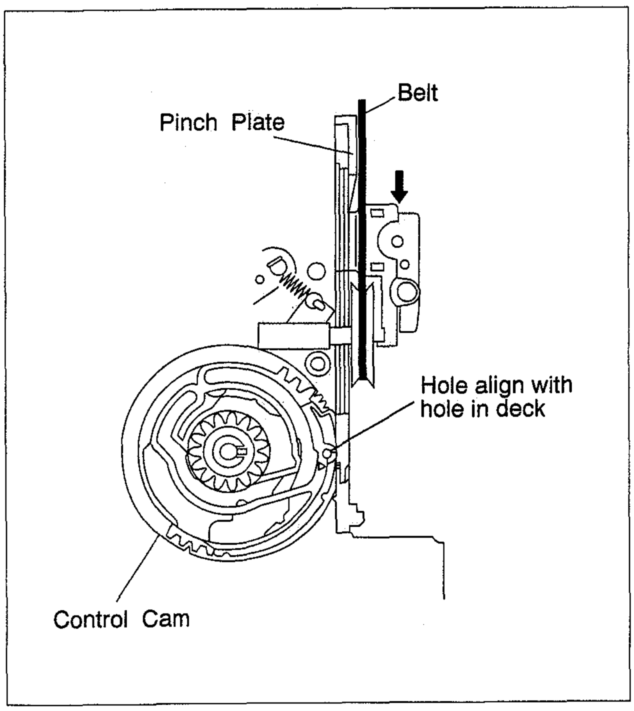


Fig. 1-4-1

1.5 SERVICE POSITION

1.5.1 How to take out the Mechanism and Main board assemblies.

(1) Remove the Top cover and Front panel assembly.
(2) Take out 2 screws Ⓑ and 2 screws Ⓒ as shown in Fig.1-5-1.

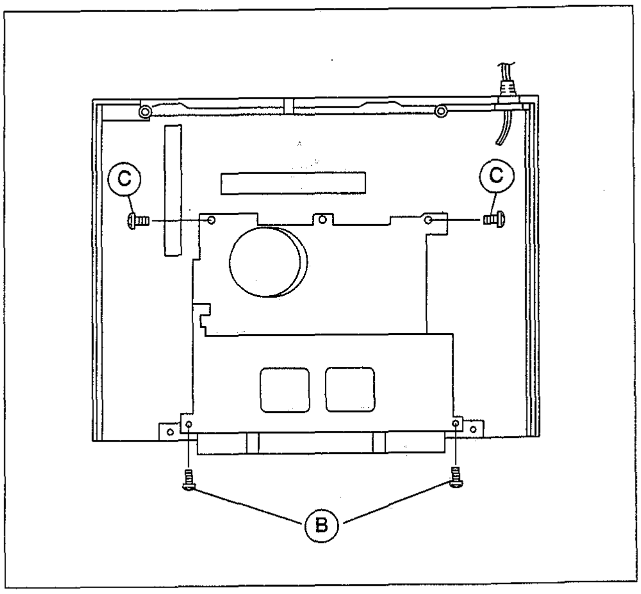


Fig. 1-5-1

(3) Take out 4 screws Ⓐ.
(4) Remove the Mechanism assembly (including Cassette housing) and Main board assembly out of the chassis as shown in Fig. 1-5-2.

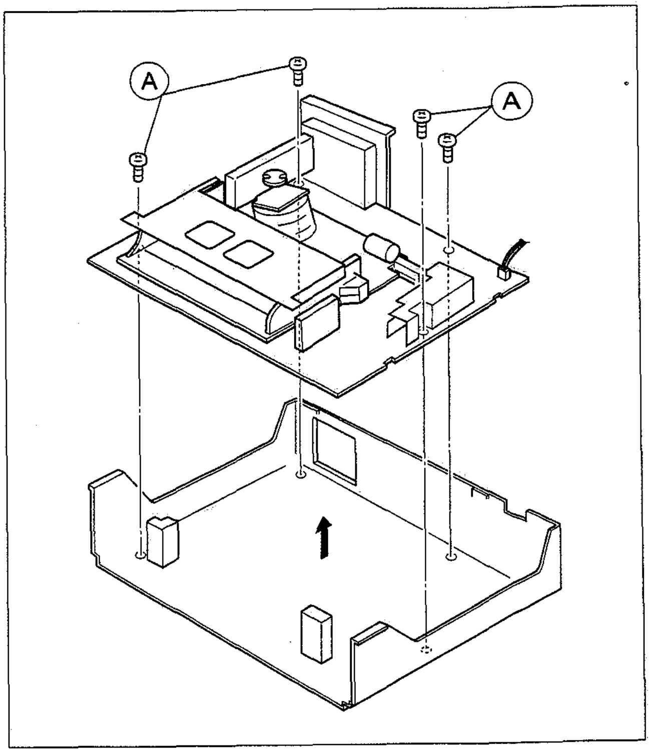


Fig. 1-5-2

(5) Turn over the Mechanism assembly and Main board assembly.
(6) Carry out checks & repairs as necessary as shown in Fig.1-5-3.

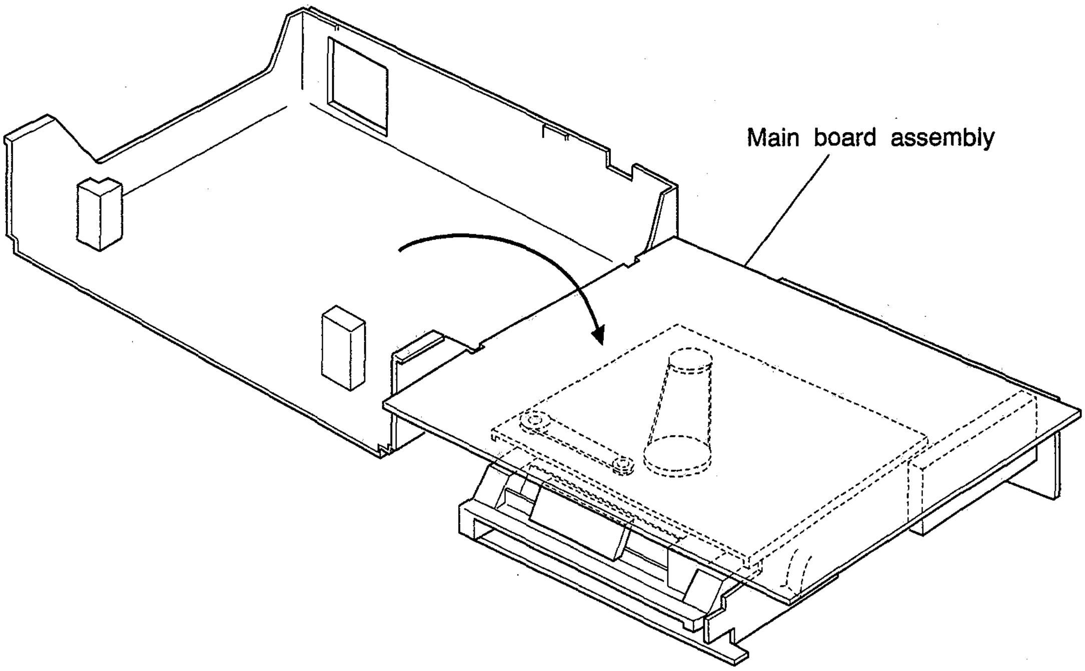

Main board assembly

Fig. 1-5-3

1.5.2 Opening on the chassis.

The chassis assembly has openings for easy access to the checkpoints and connector pins as shown in Fig.1-5-4.

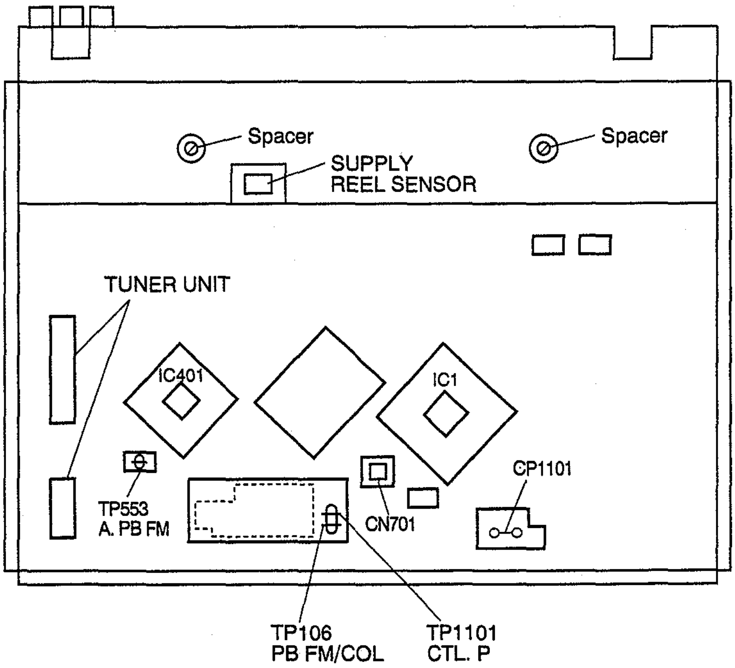

Spacer
Spacer
SUPPLY REEL SENSOR
TUNER UNIT
IC401
IC1
CP1101
TP553
A. PB FM
CN701
TP106
PB FM/COL
TP1101
CTL. P

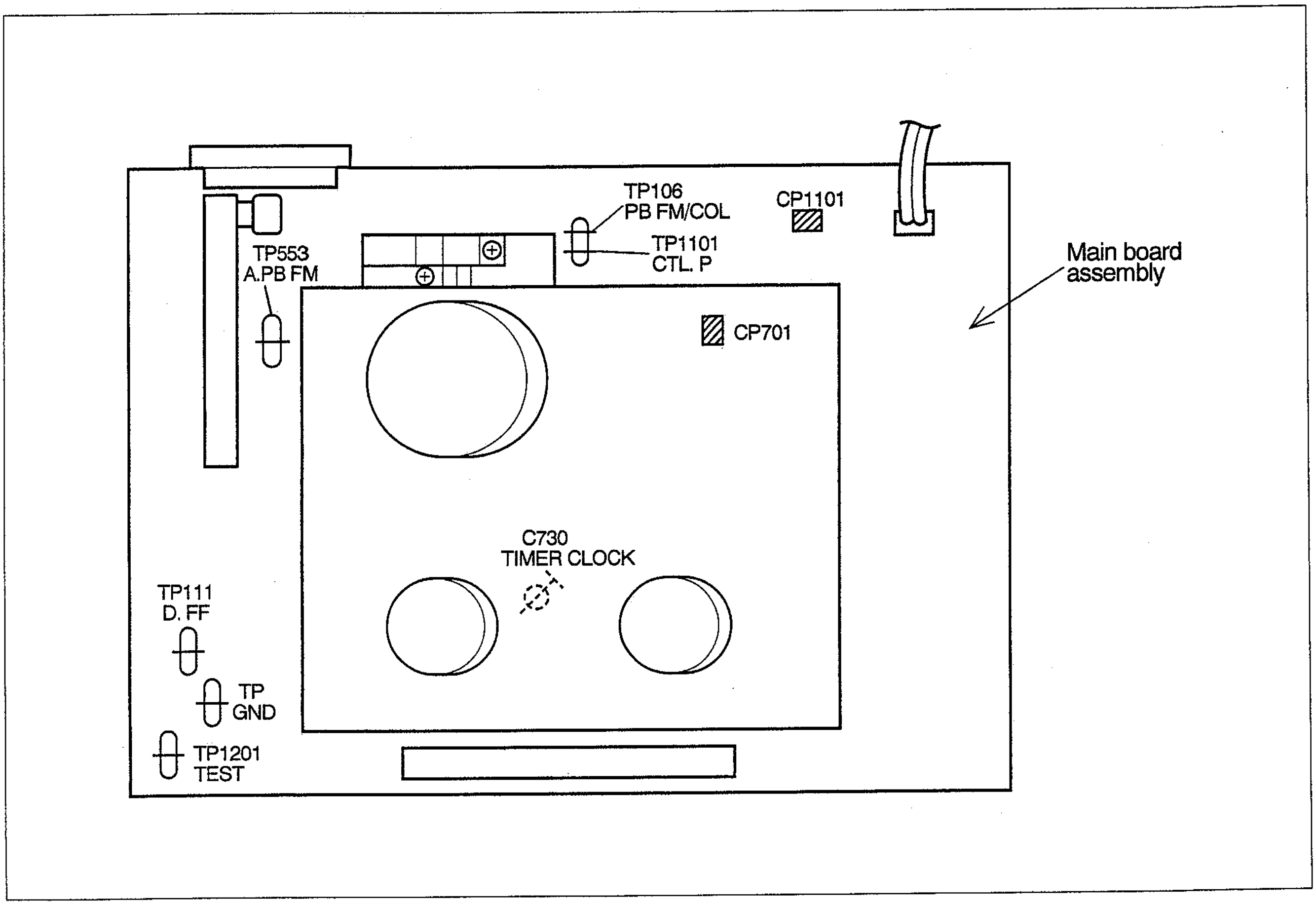
Fig. 1-5-4

1.6 MECHANISM SERVICE MODE

This model has a unique function to enter the mechanism into every operation mode without loading of any cassette tape. This function is called the "MECHANISM SERVICE MODE".

1.6.1 How to set the "MECHANISM SERVICE MODE"

(1) Disconnect VCR from AC.
(2) Remove the Top cover, Front panel assembly and cassette housing assembly. (See Page 1-2, 1-3)
(3) Connect TP GND AND TP1201 (TEST) on the Main board assembly with a jump wire.
(4) Connect VCR to AC.
(5) Press the POWER button.
(6) Select the desired operation modes with the operation buttons or remote controller.



TP106
PB FM/COL
CP1101
TP553
A.PB FM
TP1101
CTL. P
Main board assembly
CP701
C730
TIMER CLOCK
TP111
D. FF
TP
GND
TP1201
TEST

Fig. 1-6-1

1.7 EMERGENCY DISPLAY FUNCTION

This product has the function to store the last two previous emergency faults which can be displayed in the FDP when servicing.

1.7.1 How to display record of an emergency faults

(1) Press "N" button of the presetting unit more than 2 seconds. and the two previos emergency faults are shown in the FDP.

(2) Press "N" button of the presetting unit again when return the normal mode.

[Example] E : 01 : 03

↑ 03 — Emergency fault before last

↑ 01 — Emergency fault of the last time

[Example] E : — — : — — ← No record of emergency

1.7.2 Detail of emergency faults

FDP	Symptom	Detect mode	Resulting mode
E : 01	Loading motor rotates for more than 4 Sec without shift to next mode.	Loading	POWER OFF
E : 02	Loading motor rotates for more than 4 Sec without shift to next mode.	Unloading	POWER OFF
E : 03	SUP/TU REEL FG input is absent (for more 4 Sec)	REC/PLAY/FF/REW SEARCH FF/SEARCH REW	STOP → POWER OFF
E : 04	DRUM FF input is absent(for more 3 Sec)	REC/PLAY/FF/REW SEARCH FF/SEARCH REW	STOP
E : 05	(NOT USED)	—	—
E : 06	CAPSTAN FG input is absent(for more 1 Sec)	REC/PLAY/FF/REW SEARCH FF/SEARCH REW	STOP → POWER OFF
E : 07	No SWD5V/12V	POWER ON	POWER OFF

Table 1-7-1 EMERGENCY FAULTS

1.7.3 How to clear emergency record

Press the COUNTER RESET button on the remote controller in the emergency record display mode,and the record of the emergency fault(s) is cleared.

SECTION 2
MECHANISM ADJUSTMENT

2.1 PREPARATION

2.1.1 Precautions

(1) Disconnect VCR from AC power before soldering.
(2) Avoid imparting stress to wires when disengaging connectors.
(3) Determine and correct the cause of difficulty before proceeding to adjustments.Do not disturb settings unnecessarily.
(4) Use care not to damage tabs,claws,etc during repairs.
(5) Install the cassette housing assembly only when the mechanism is in the MECHANISM ASSEMBLING MODE position.
(6) When installing the Front panel assembly,be sure to engage the housing door with the door opener of the cassette housing assembly.
If this is omitted,the cassette door will not open at Eject and the cassette can not be removed. (See SECTION 1 DISASSEMBLY)

2.1.2 Check without cassette housing assembly.

Mechanism operations can be observed easily by removing the cassette housing assembly. Use the MECHANISM SERVICE MODE (See SECTION 1 DISASSEMBLY).

2.1.3 Manual removal of loaded tape

When the deck enters the emergency mode with cassette tape loaded and it can not be ejected by pressing the EJECT button,take out of the cassette tape according to the following procedure.

(1) Disconnect the power cord from AC outlet then take out the Top cover and Front panel assembly.
(2) Turn the loading motor on the Main deck assembly by hand in the unloading direction to where the pole base assembly (supply and take-up) is positioned below the cassette tape.At that time, pay careful attention to the tape not to get soiled with grease.
(3) Take out 4 screws of the cassette housing assembly.(See SECTION 1 DISASSEMBLY)
(4) Remove the cassette housing with slackened tape and guard panel of cassette.
(5) Wind up the tape by turning the reel hub(either supply or take-up side for convenience) from the bottom of the cassette,and remove the cassette tape.

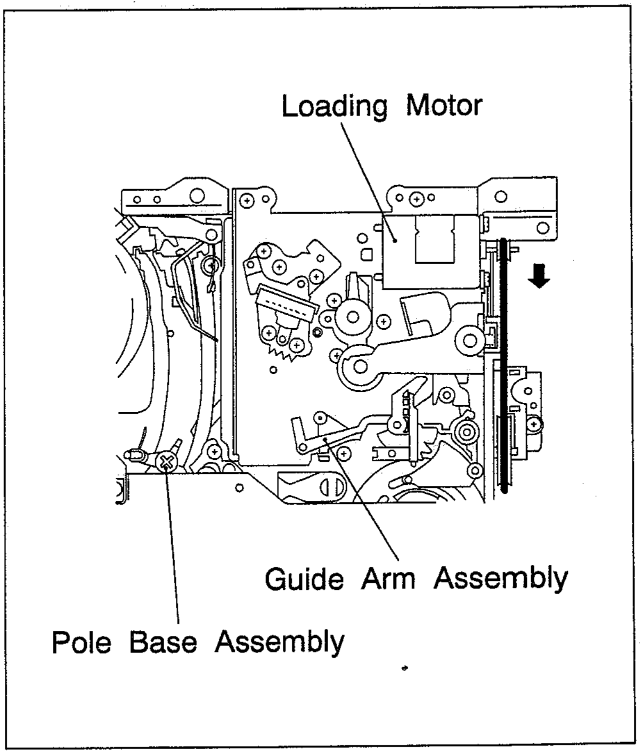


Fig. 2-1-1

2.1.4 Test Equipment

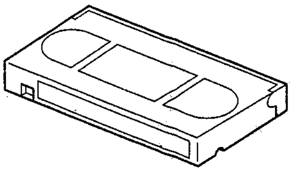
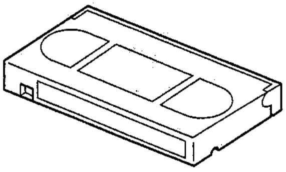
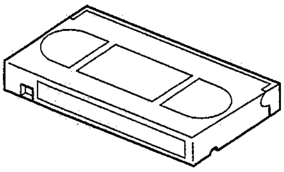
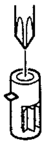
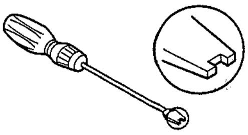
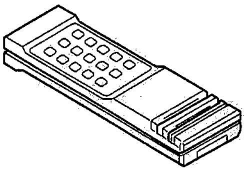
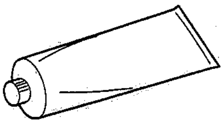
Alignment tape (SP) MHP	Alignment tape (EP) MHP-L	Back tension cassette gauge PUJ48076-2	A/C head positioning tool PTU94010
			
Roller driver PTU94002	Presetting unit PTU94008	Grease KYODO-SH-P	
			

Table 2-1-1 Test equipment

2.2 MAIN MECHANISM PARTS

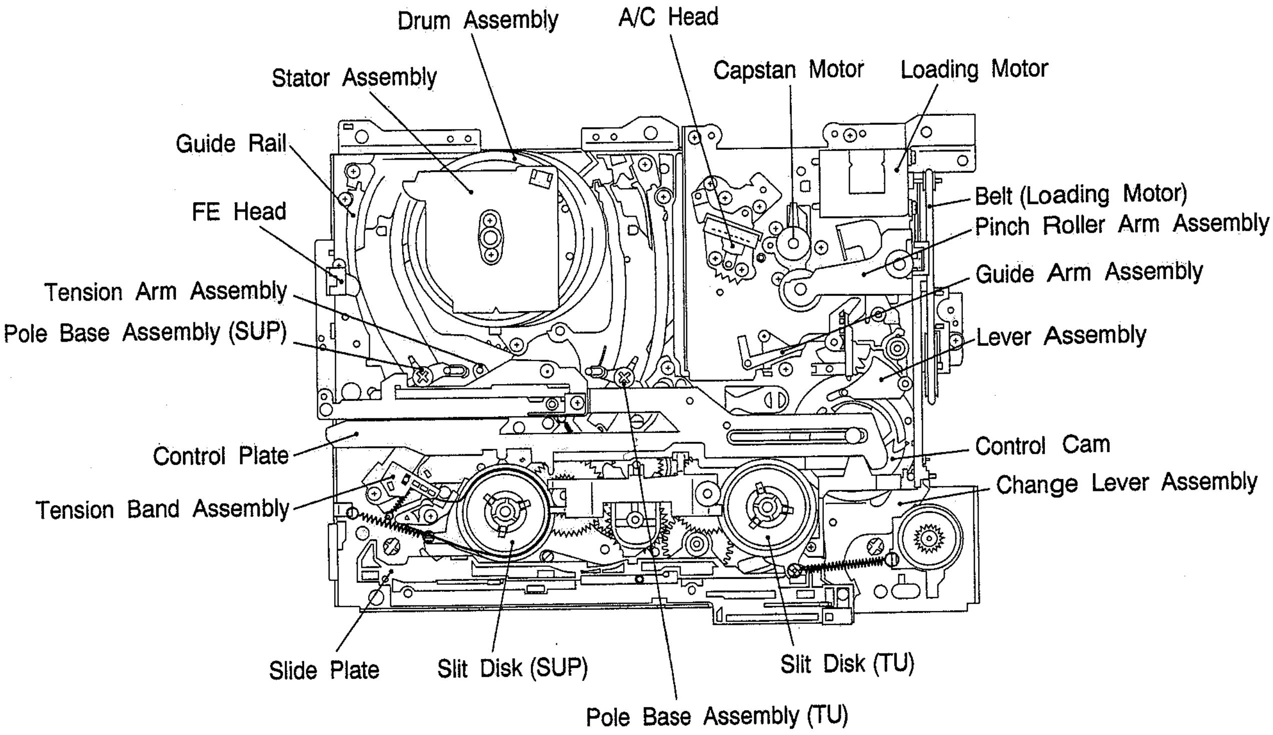

Drum Assembly
A/C Head
Stator Assembly
Capstan Motor
Loading Motor
Guide Rail
FE Head
Belt (Loading Motor)
Pinch Roller Arm Assembly
Guide Arm Assembly
Tension Arm Assembly
Pole Base Assembly (SUP)
Lever Assembly
Control Plate
Control Cam
Tension Band Assembly
Change Lever Assembly
Slide Plate
Slit Disk (SUP)
Slit Disk (TU)
Pole Base Assembly (TU)

Fig. 2-2-1 Top view of main deck

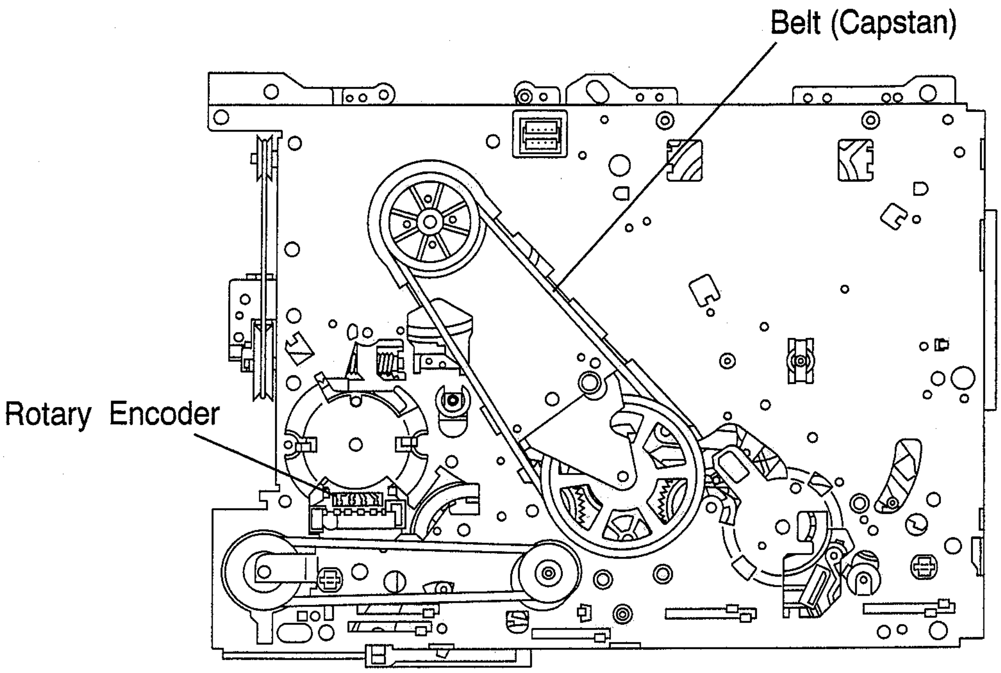


Fig. 2-2-2 Bottom view of main deck

2.2.1 Cleaning

Periodic cleaning of the tape transport system is desirable,but usually not feasible in practice.Therefore,perform cleaning when a set is brought in for repairs or maintenance. Contamination of the video heads,tape guides and brush can detract from playback picture quality and in extreme cases,even damage the tape.For cleaning,use a finemesh cotton cloth(about the texture of a white dress-shirt) moistened in alcohol. It is recomended to also clean the tape tension posts and capstan.

- To clean the video heads,press the moistened cloth gently against the upper drum with fingertip and turn the drum by hand.
- Do not use a vertical stroke,as this may damage the heads.

2.2.2 Lubrication

Oil and grease do not normally require periodic replenishing. Apply only when replacing lubricated parts(also clean and replace lubrication of mating parts if soiled). For parts and points to apply oil and grease, refer to the exploded views of the mechanism assembly. Before oiling,clean with alcohol.Apply one or two drops of oil. Avoid excess oil.

1. Table 2-2-1 indicates the oil and grease used in this set. Use these or recommended locally available equivalents.

Category	Part No.
Oil	COSMO-HV56
Grease	KYODO-SH-P

Table 2-2-1

2. Grease is not required for a replacement cassette housing assembly,as this has been applied at the factory.

NOTE : *Stir grease that has been stored for an extended period.*

2.3 INSPECTION AND MAINTENANCE

This product employs rotary and moving parts which wear out in the course of usage.Periodic inspection, cleaning, lubrication and maintenance are therefore important for ensuring maximum performance. Worn parts must also be replaced as and when required.

2.3.1 Suggested servicing schedule for main components

The following table indicates the suggested period for such service measures as cleaning,lubrication and replacement. In practice, the indicated periods will vary widely according to environmental and usage conditions.However, the indicated components should be inspected when a set is brought for service and the maintenance work performed if necessary. Also note that rubber parts may deform in time,even if the set is not used.

System	Parts Name	Operation Hours	
		~1000H	~2000H
Tape transport	Upper drum assembly	★○	○
	A/C head	★○	★○
	Lower drum motor assembly	★	★○
	Pinch roller arm assembly	★	★
	Full erase head	★	★
	Tension arm assembly	★	★
	Guide arm assembly	★	★
Drive	Capstan motor		○
	Belt (Capstan)	○	○
	Belt (Loading motor)		○
	Loading motor		○
	Slit disk (supply, take-up)		○
	Clutch unit (supply, take-up)		○
	Worm gear assembly		○
	Control plate		○
	Slide plate		○
Other	Brush assembly	★○	★○
	Tension band assembly	○	○
	Rotary encoder		○

★ : Cleaning

○ : Inspection or Replacement if necessary

Table 2-3-1

2.4 DISASSEMBLY/ASSEMBLY PROCEDURE OF MECHANISM

2.4.1 Precaution before disassembling mechanism

This mechanism has an exclusive operation mode provided for disassembling and installation of the mechanism (MECHANISM ASSEMBLING MODE), and it is suggested to set the mechanism to this mode before disassembly and installation.The exclusive mechanism operation mode is not generally used and becomes available by manual setting only. Then this procedure starts with the condition that the cabinet parts and cassette housing assembly have been removed.

2.4.2 How to set the exclusive mechanism operation mode (MECHANISM ASSEMBLING MODE)

(1) Turn the loading motor belt by hand.
(2) Confirm that the hole of the control cam are aligned to the deck hole as shown in Fig.2-4-1.

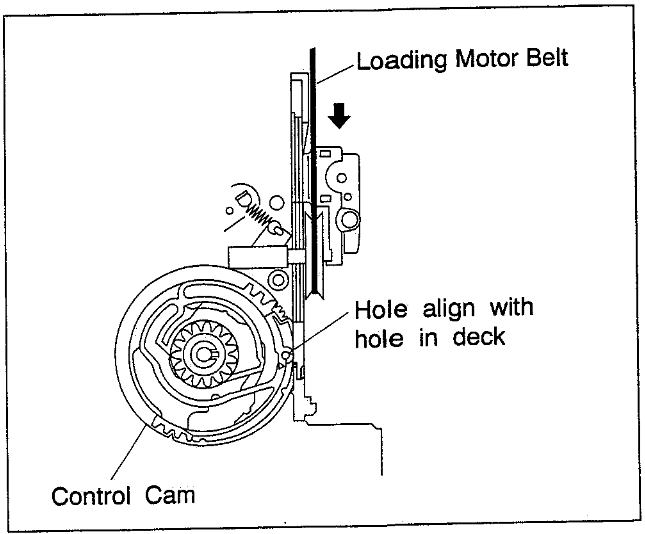


Fig. 2-4-1

2.5 MAIN PARTS REPLACEMENT OF MECHANISM

2.5.1 Pinch Roller Arm Assembly

(1) Remove the slit washer.
(2) Tilt up the pinch roller assembly in direction of arrow.

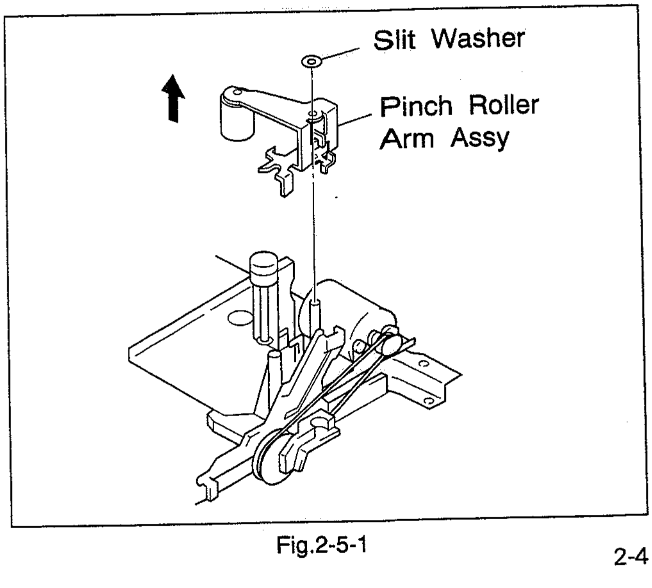


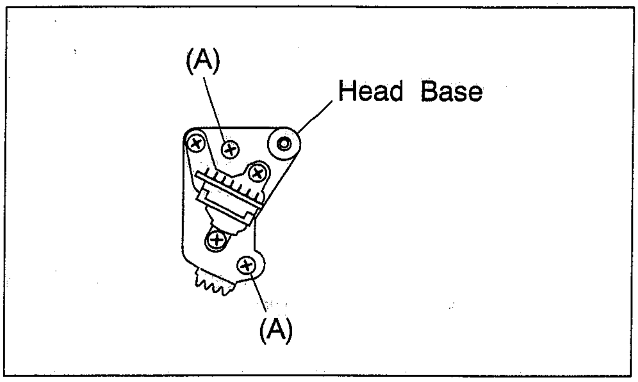
Fig.2-5-1

2.5.2 A/C Head

1. Removal

(1) Take out 2 screws (A).

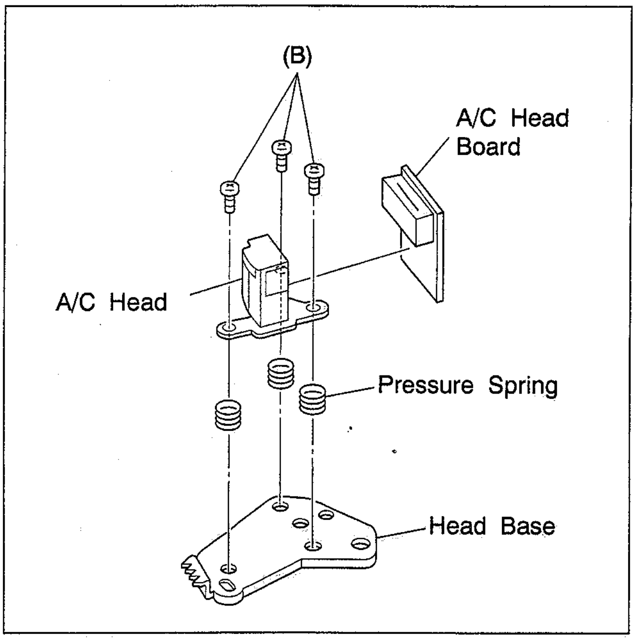
(2) Remove the A/C head with head base.



(A)
Head Base
(A)

Fig.2-5-2

(3) When replacing the A/C head only,remove 3 screws (B), use care not to misplace the 3 springs.

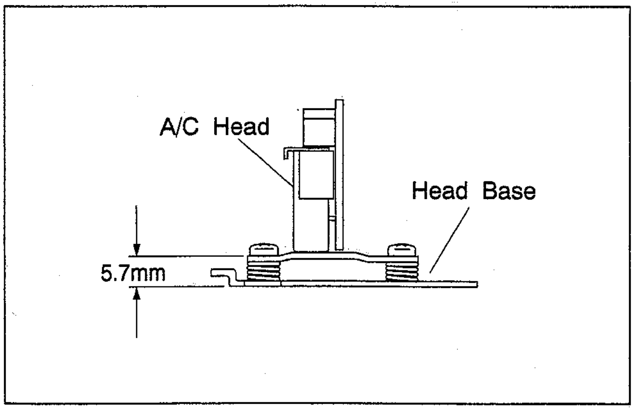


(B)
A/C Head Board
A/C Head
Pressure Spring
Head Base

Fig.2-5-3

2. Installation

(1) Temporarily set A/C head height as indicated in Fig. 2-5-4.



A/C Head
Head Base
5.7mm

Fig.2-5-4

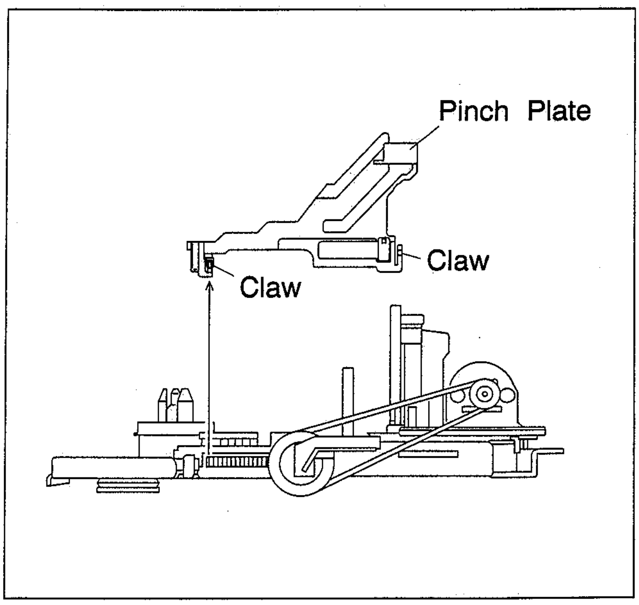
NOTES:

- *It is very important to correctly adjust the control pulse and audio signal in addition to the mechanical tape path.*
- *Perform interchangeability adjustments after electrical adjustments.*

2.5.3 Pinch Plate

1. Removal

(1) Disengage 2 claws, then remove the pinch plate.

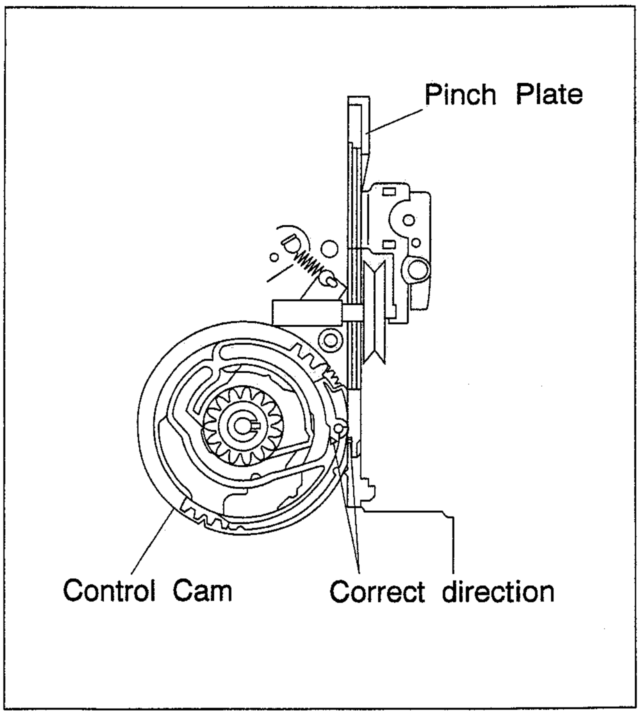


Pinch Plate
Claw
Claw

Fig.2-5-5

2. Installation

(1) When installing pinch plate,align rack of pinch plate and triangle mark of control cam as indicated in Fig.2-5-6.



Pinch Plate
Control Cam
Correct direction

Fig. 2-5-6

2.5.4 Loading Motor

(1) Disengage the belt between loading motor and worm gear.
(2) Take out 2 screws (A) then remove the loading motor.

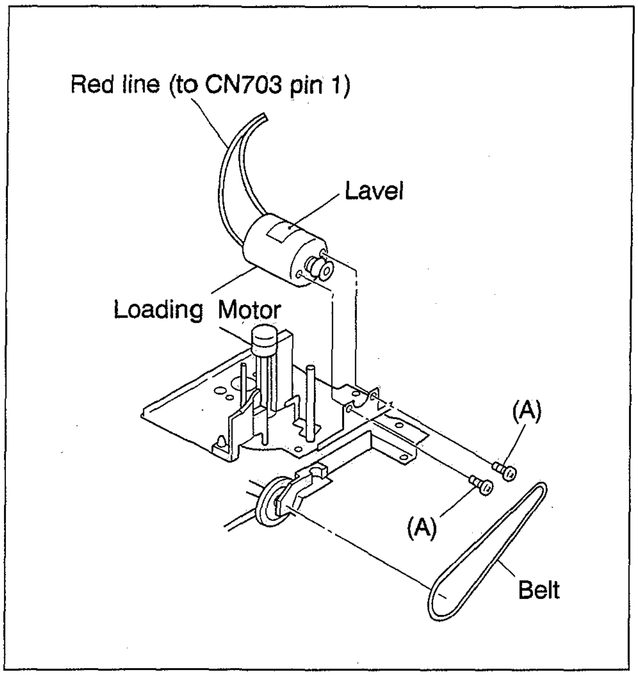

Red line (to CN703 pin 1)
Lavel
Loading Motor
(A)
(A)
Belt

Fig.2-5-7

2.5.5 Lever Assmebly,Sub Deck Assembly,Capstan Motor

(1) Take out 1 slit washer,then remove the lever assembly.
(2) Disengage the belt(capstan motor) from bottom of mechanism assembly first as indicated in Fig.2-5-10.
(3) Take out 3 screws (A) and remove the sub deck assembly as indicated in Fig.2-5-8.
(4) Take out 3 screws (B) and remove the capstan motor from the sub deck assembly as indicated in Fig.2-5-9.

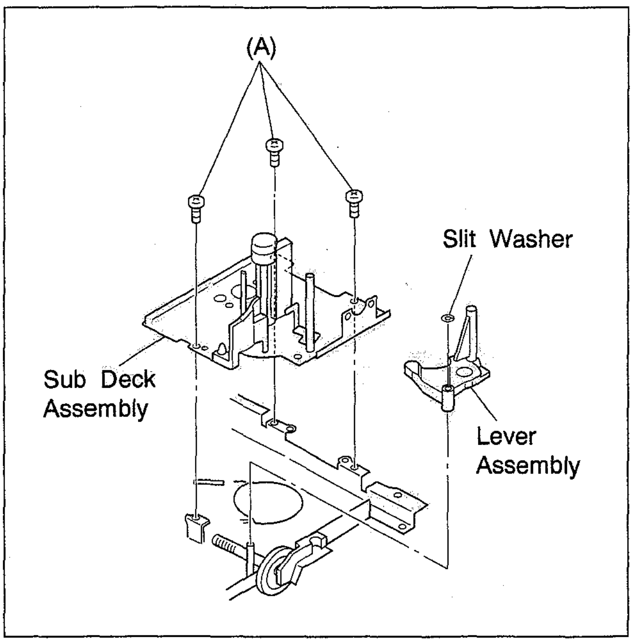

(A)
Slit Washer
Sub Deck Assembly
Lever Assembly

Fig.2-5-8

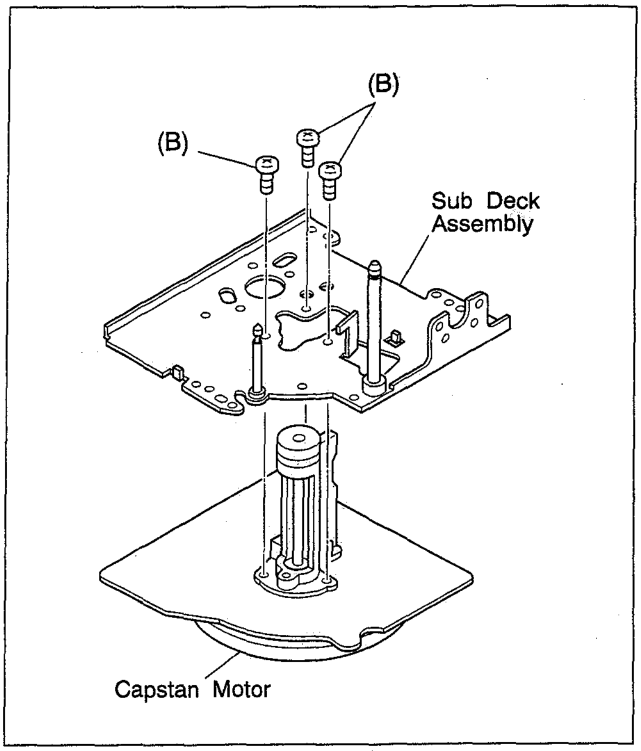

(B)
(B)
Sub Deck Assembly
Capstan Motor

Fig.2-5-9

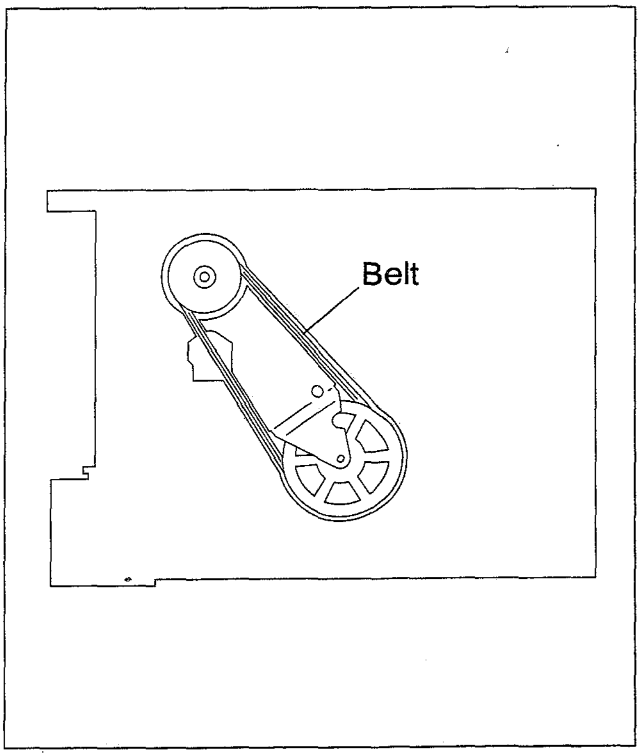


Fig.2-5-10

2.5.6 Control Bracket

(1) Take out 1 screw (A) and 1 screw (B).
(2) Remove the control bracket.

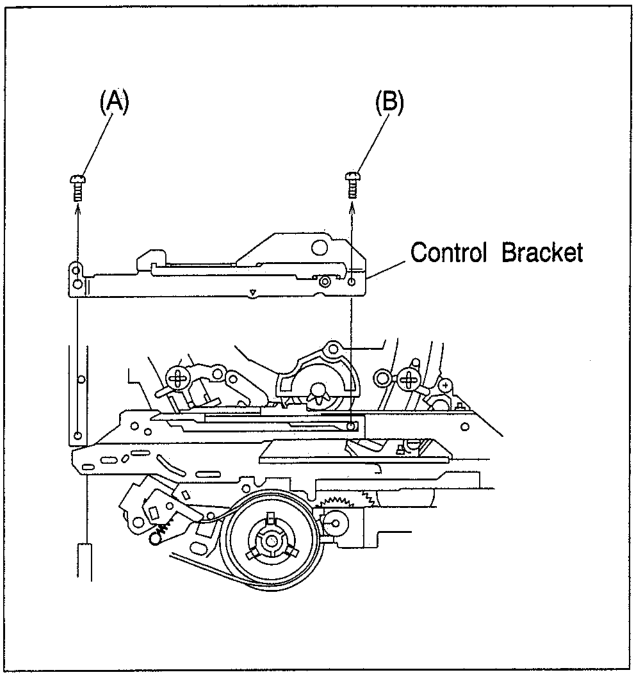

(A)
(B)
Control Bracket

Fig.2-5-11

2.5.7 Slit disk (take-up)

(1) Take out 2 slit washers.
(2) Remove the slite disk (take-up).

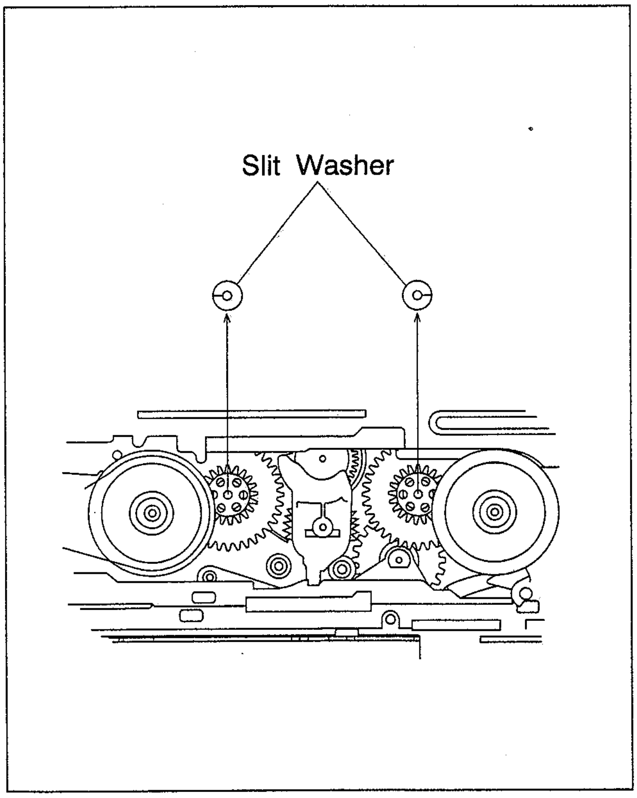

Slit Washer

Fig.2-5-12

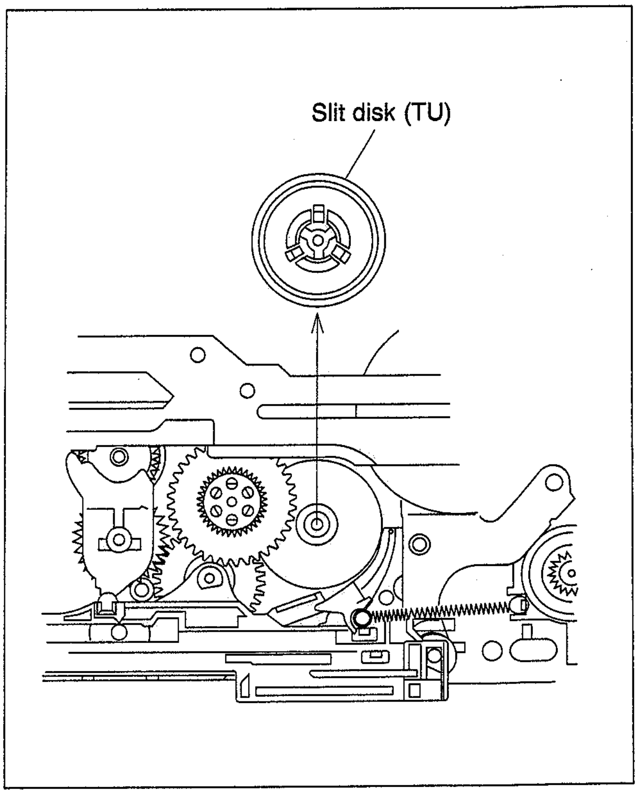

Slit disk (TU)

Fig.2-5-13

2.5.8 Control Plate

(1) Take out 1 slit washer.
(2) Disengage 2 claws and remove the control plate.

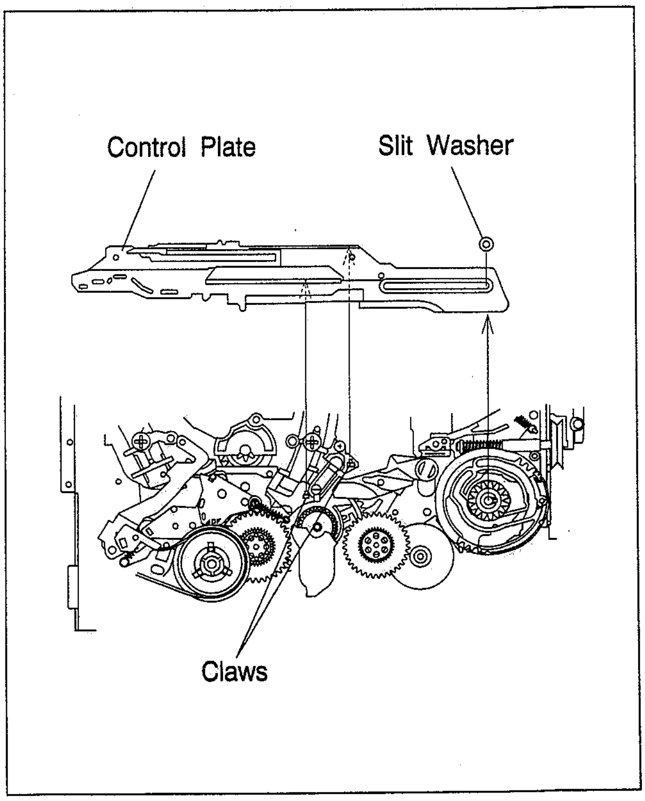

Control Plate
Slit Washer
Claws

Fig.2-5-14

2.5.9 Sub Brake(take-up),Control Cam

(1) Disengage 1 spring (a) and 1 claw then remove the sub brake (take-up).
(2) Disengage 1 claw and remove the control cam.

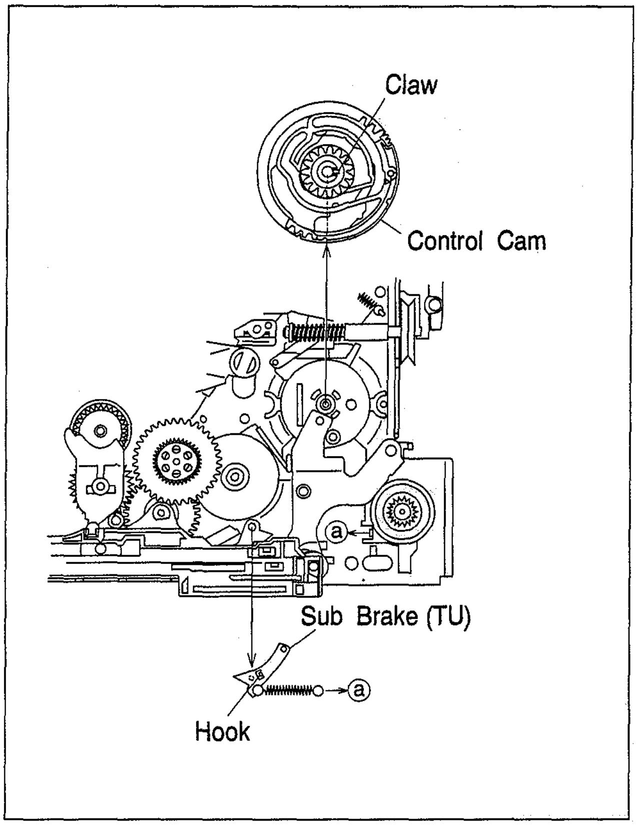

Claw
Control Cam
a
Sub Brake (TU)
a
Hook

Fig.2-5-15

2.5.10 Slide Plate

(1) Disengage 7 claws from bottom of the mechanism assembly and remove the slide plate.

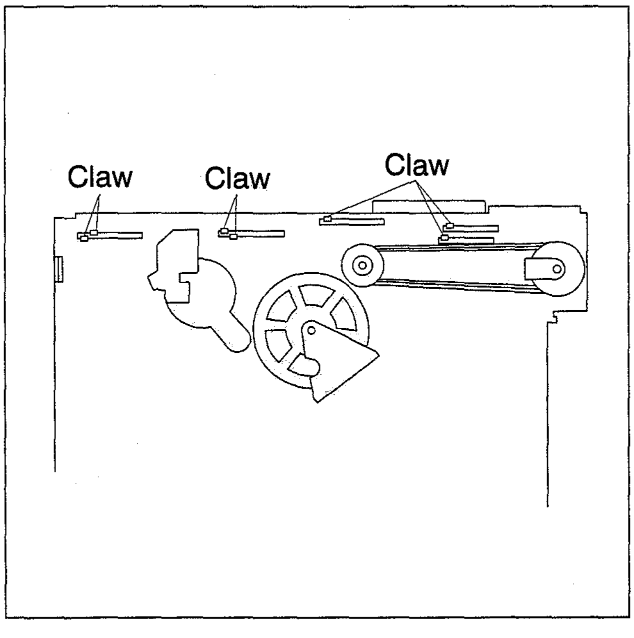

Claw
Claw
Claw

Fig. 2-5-16

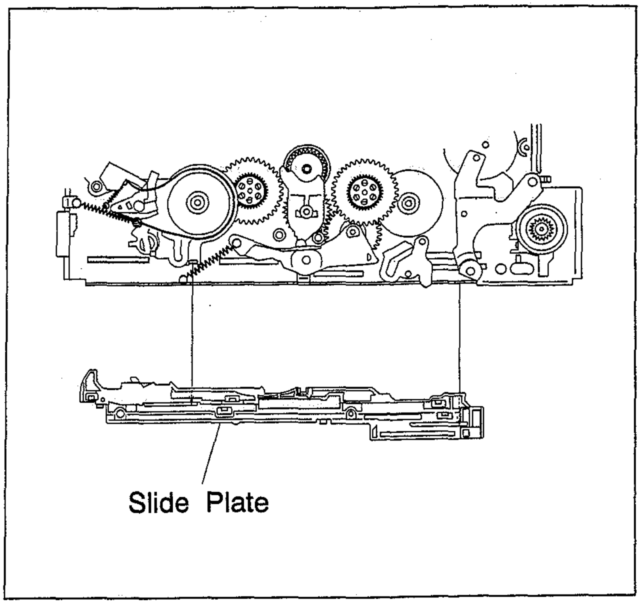

Slide Plate

Fig. 2-5-17

2.5.11 Change Lever,Rotary Encoder

(1) Remove the change lever.
(2) Disengage 2 claws and remove the rotary encoder.

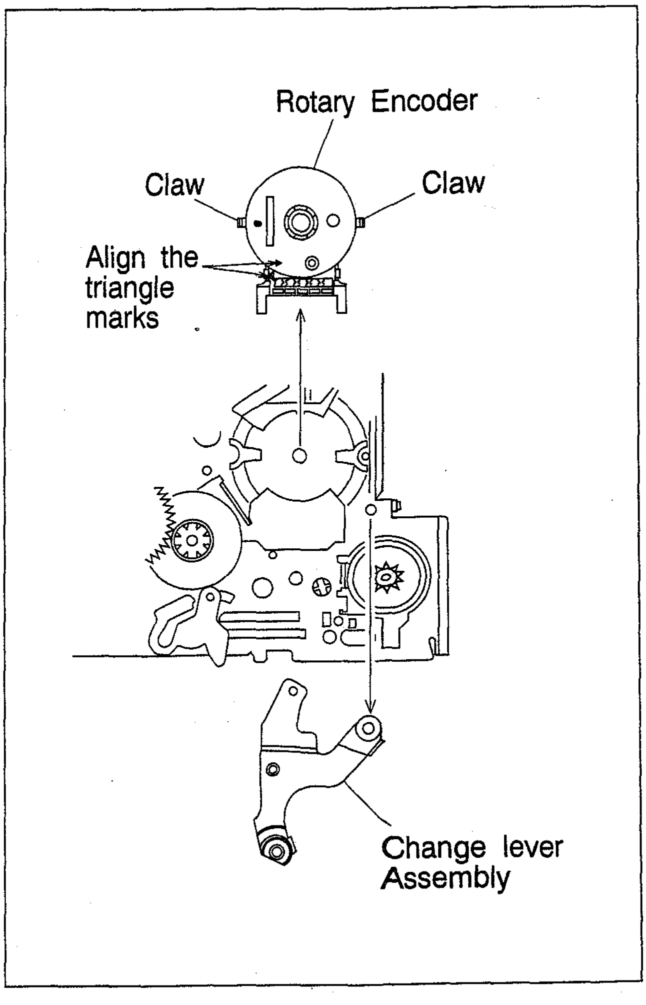

Rotary Encoder
Claw
Claw
Align the triangle marks
Change lever Assembly

Fig. 2-5-18

2.5.12 Sub Brake (supply),Tension Band Assembly, Tension Arm Assembly, Take-up Lever Assembly,Slit Disk(supply)

(1) Disengage 1 spring ⓐ.
(2) Disengage 1 claw and remove the sub brake (supply).
(3) Take out 1 spring Ⓒ and slit washer.
(4) Remove the tension arm assembly with tension band assembly.
(5) Disengage 1 spring ⓑ and remove the take-up lever assembly.
(6) Remove the slit disk(supply).

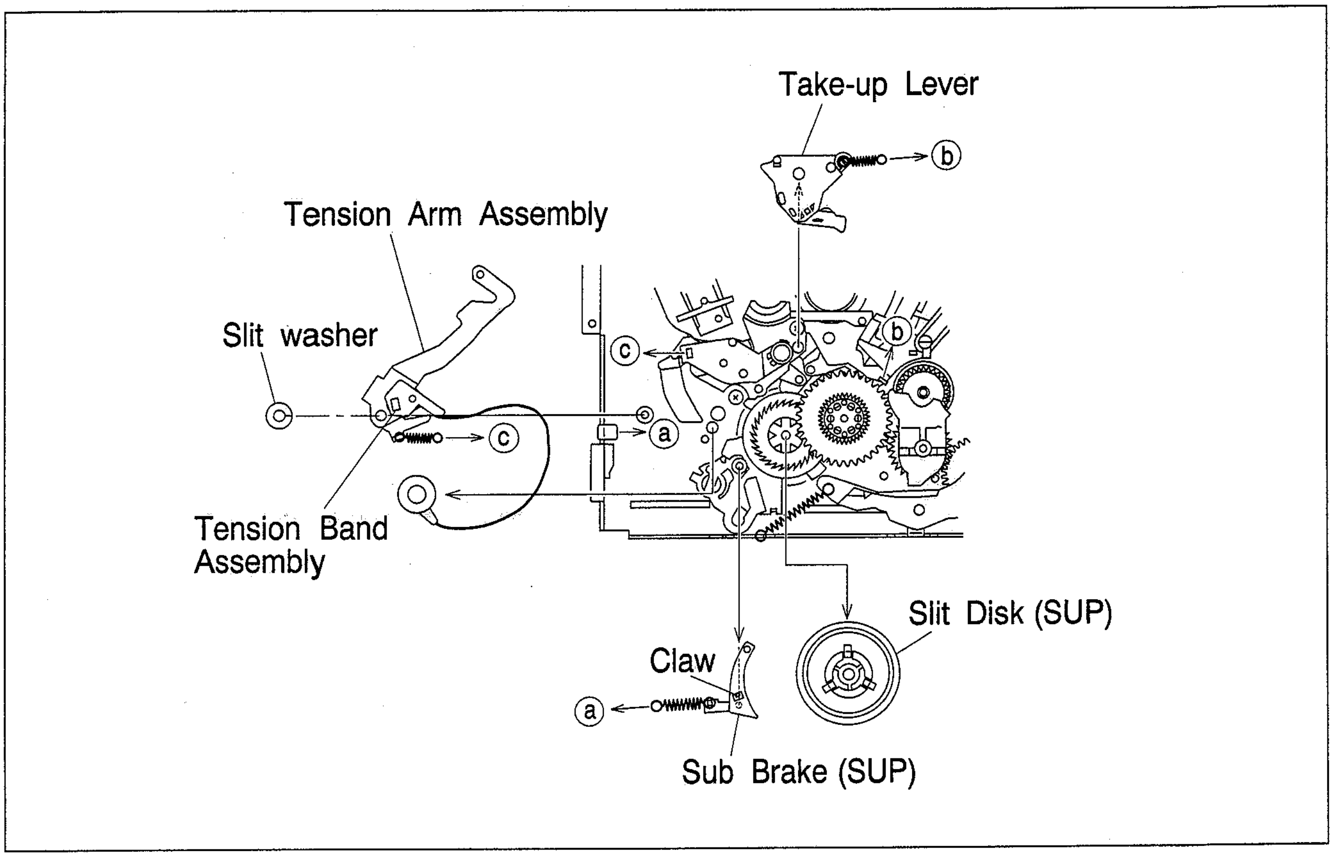

Take-up Lever
ⓑ
Tension Arm Assembly
Slit washer
ⓒ
ⓒ
ⓐ
ⓑ
Tension Band Assembly
Slit Disk (SUP)
Claw
ⓐ
Sub Brake (SUP)

Fig. 2-5-19

2.5.13 Take-up Head,Tension Arm Lever

(1) Remove the take-up head and tension arm lever.

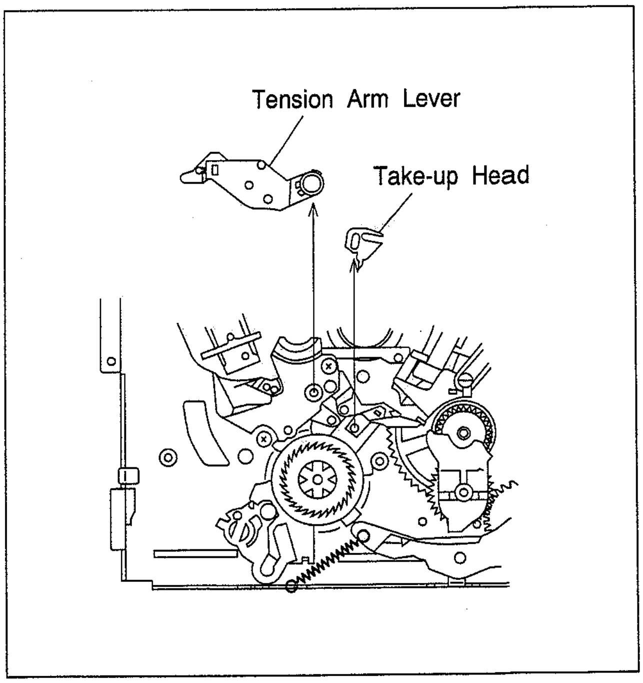

Tension Arm Lever
Take-up Head

Fig.2-5-20

2.5.14 Guide Rail

(1) Take out 5 screws Ⓐ and 1 screw Ⓑ.

(2) Disengage 4 claws and remove the guide rail.

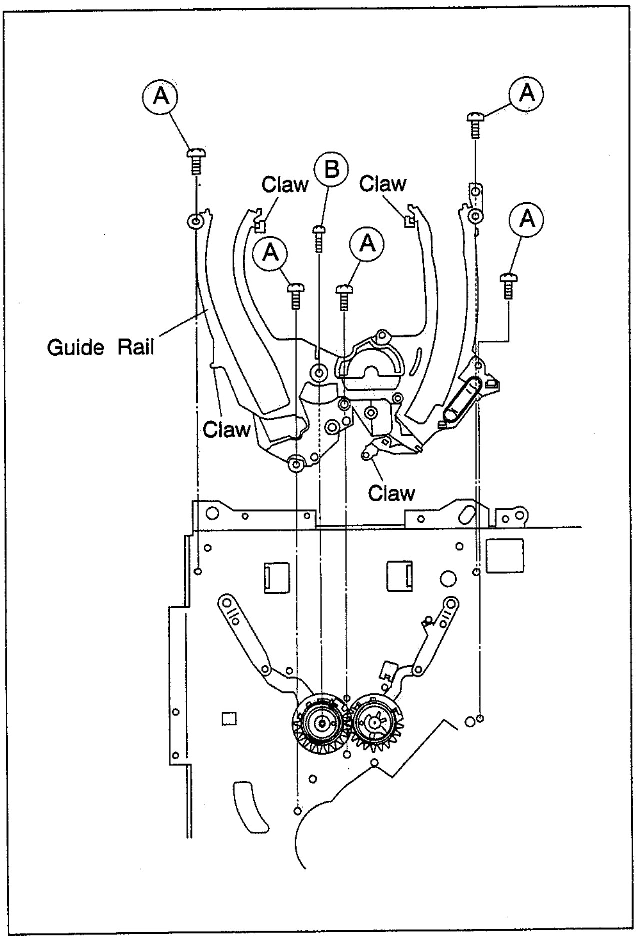

Ⓐ
Ⓐ
Claw
Ⓑ
Claw
Ⓐ
Ⓐ
Ⓐ
Guide Rail
Claw
Claw

Fig. 2-5-21

2.5.15 Stator Assembly

(1) Take out 2 screws (A).

(2) Raise the stator assembly in the direction indicated by the arrow to remove it.

(3) Remove the flat cable.

(4) To reinstall,first secure the flat cable,then insert 2 screws (A).

(5) After reinstalling, be sure to perform PB switching point adjustment(See SECTION 3 ELECTRICAL ADJUSTMENT).

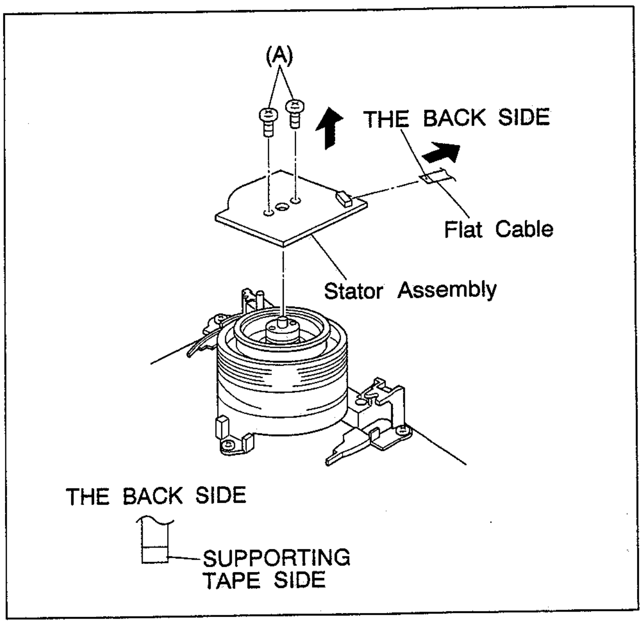

(A)
THE BACK SIDE
Flat Cable
Stator Assembly
THE BACK SIDE
SUPPORTING TAPE SIDE

Fig. 2-5-22

NOTE : *When refitting the connector, check that the flat wire is inserted correctly.*

2.5.16 Rotor Assembly

(1) Remove the stator Assembly.

(2) Take out 2 screws (B) and remove the rotor Assembly.

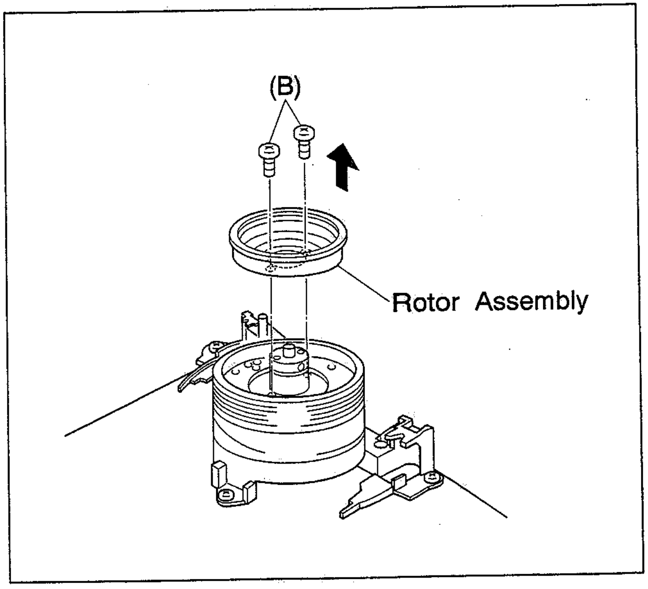

(B)
Rotor Assembly

Fig.2-5-23

(3) Align the upper drum assembly and rotor assembly phase as indicated in Fig.2-5-24.
(4) Overlap holes (a) of the upper drum assembly with holes (b) of the rotor assembly and secure with 2 screws (B) as indicated in Fig.2-5-23.

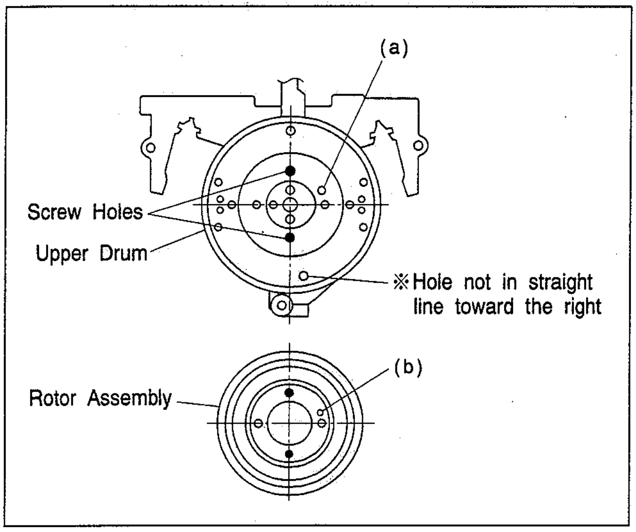

(a)
Screw Holes
Upper Drum
※Hole not in straight line toward the right
(b)
Rotor Assembly

Fig. 2-5-24

2.5.17 Upper Drum Assembly

1. Removal

(1) Remove the stator assembly and rotor assembly.
(2) Use a 1.5 mm hexagonal wrench to loosen the collar assembly screw and remove the collar assembly with brush, and remove the cap.
(3) Remove the upper drum assembly and use tweezers to remove the washer.

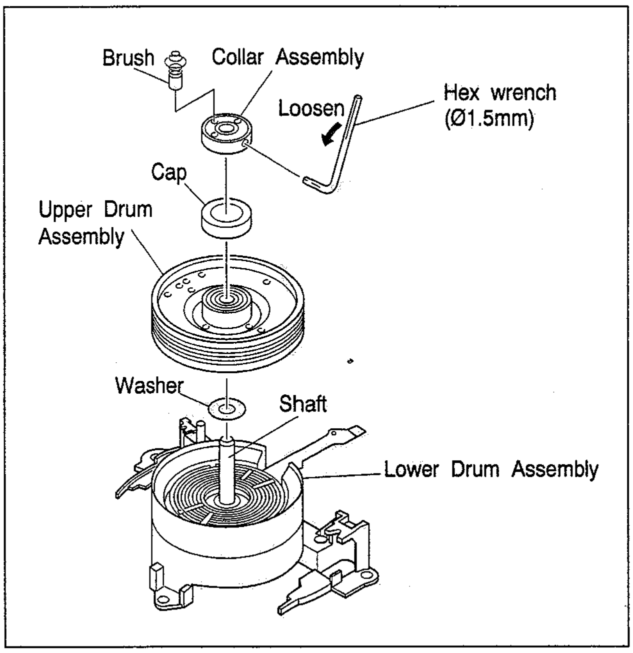

Brush
Collar Assembly
Loosen
Hex wrench (Ø1.5mm)
Cap
Upper Drum Assembly
Washer
Shaft
Lower Drum Assembly

Fig. 2-5-25

NOTE : *If the Brush is replaced, do not apply the grease to the contacts.*

2. Installation

(1) Use an air brush to clean the lower drum assembly and the coil section of the new upper drum assembly.
(2) Set a new washer on the drum shaft as indicated in Fig.2-5-25.

NOTE : *Be sure to use the new washer when replace the upper drum assembly.*

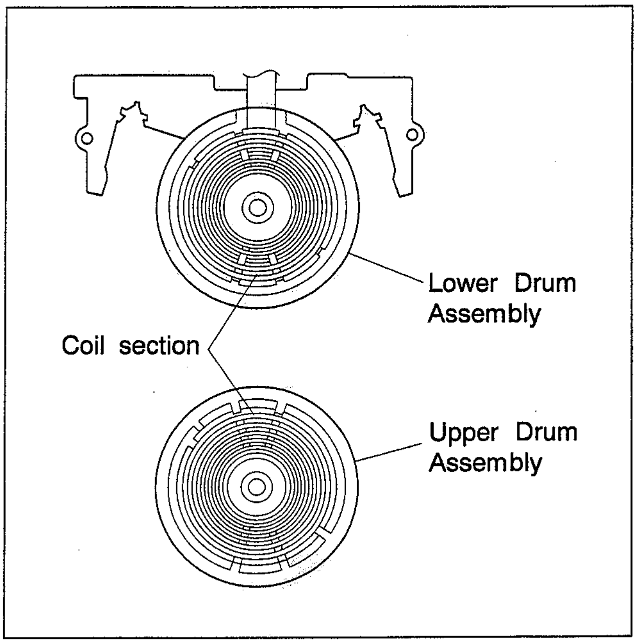

Lower Drum Assembly
Coil section
Upper Drum Assembly

Fig.2-5-26

(3) Note the top and bottom of the collar assembly and determine the position as indicated in Fig.2-5-27.

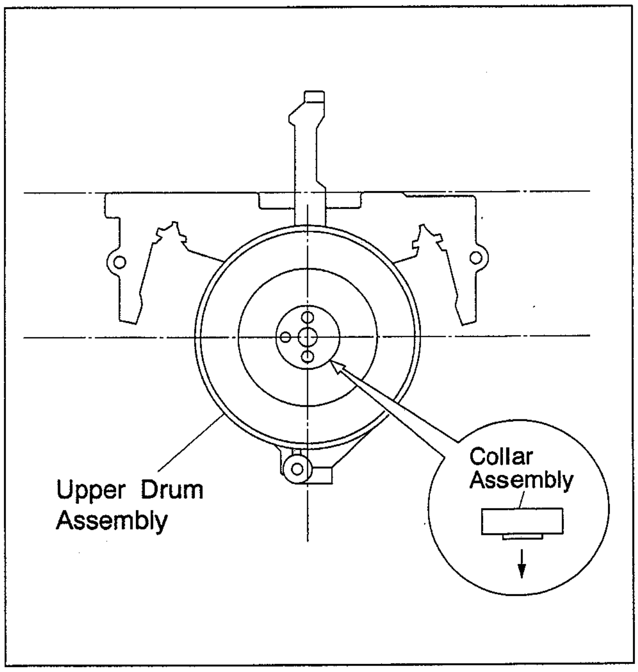

Upper Drum Assembly
Collar Assembly

Fig.2-5-27

(4) While pressing the collar assembly evenly from above with your fingertips,secure the hexagonal screw.

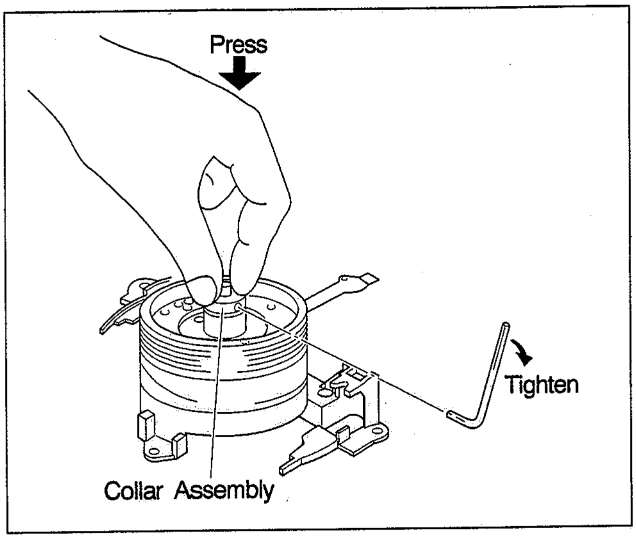

Press
Tighten
Collar Assembly

Fig.2-5-28

(5) After installing,gently turn the upper drum by hand and confirm normal rotation.
(6) Install the rotor assembly and stator assembly.
(7) Clean the upper and lower drum assembly and perform the following adjustments;
- PB switching point adjustment
- Slow tracking preset adjustment
- Interchangeability adjustment (be sure to check EP mode)

2.6 CHECKUP AND ADJUSTMENT OF MECHANISM PHASE

2.6.1 Precaution

The rotary encoder and syscon circuit are closely interrelated.Therefore,the rotary encoder and control cam connection determines the operations of mechanical parts such as plates,gears,brakes,etc.Correct positioning of these parts is essential for smooth tape loading and mechanical operations.

2.6.2 Loading Arm Assembly (supply,take-up)

(1) Install the supply loading arm assembly and the take-up loading arm assembly so that their positioning markings on the respective gear face each other and the holes of their arms correspond to the holes on the main deck assembly respectively.
(2) After setting the guide rails,engage the pole base assemblies with the tip of the loading arms respectively. Then,enter the mechanism into the unloading mode to return the pole base assemblies to the front position.
(3) Reassemble the peripheral parts of the guide rail to its original position.

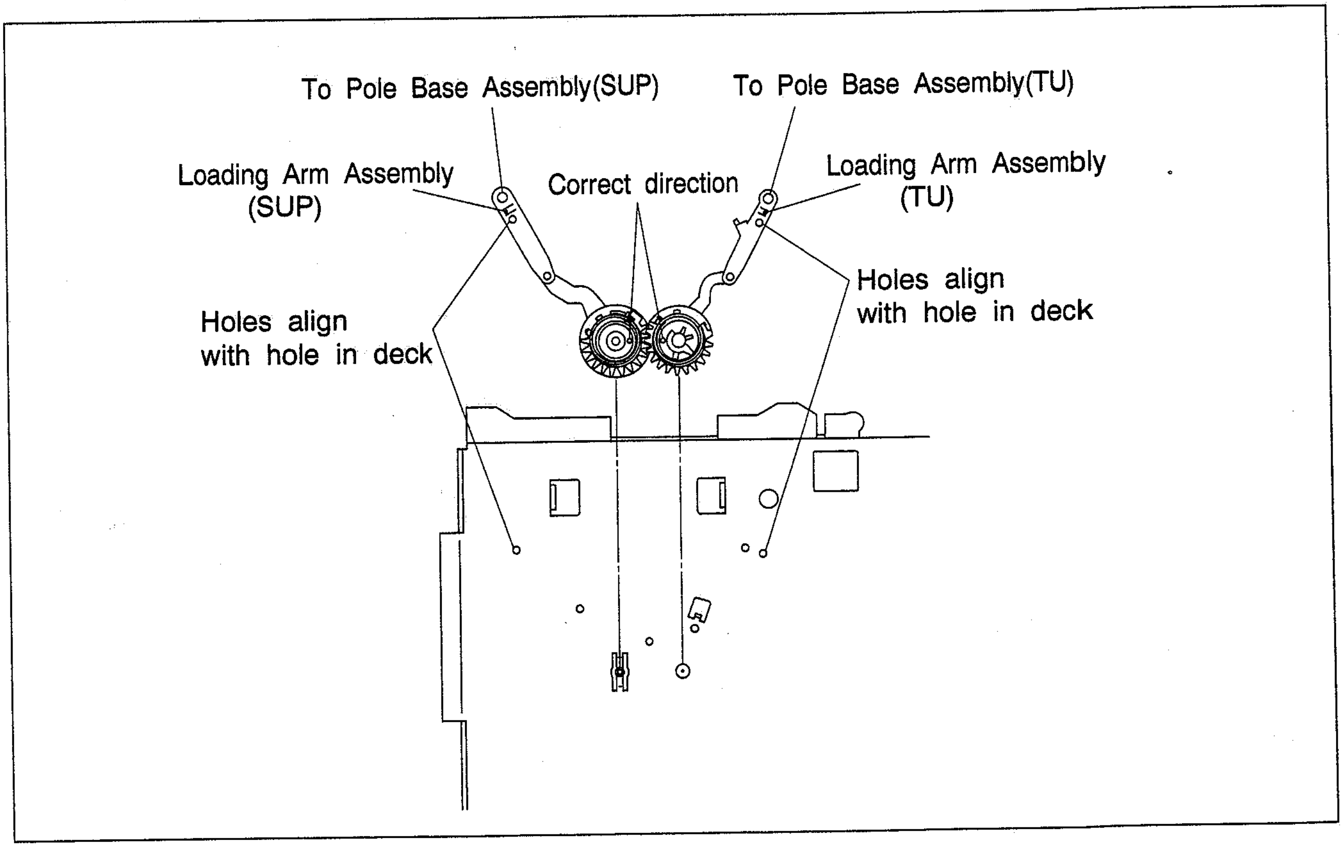

To Pole Base Assembly(SUP)
To Pole Base Assembly(TU)
Loading Arm Assembly (SUP)
Correct direction
Loading Arm Assembly (TU)
Holes align with hole in deck
Holes align with hole in deck

Fig. 2-6-1

2.6.3 Rotary Encoder,Change Lever,Control Cam

(1) When reinstalling the rotary encoder,adjust its position so as to fit the triangle marks each other and push it deep untill it is locked by the pawls.

(2) When reinstalling the change lever,set it so as to make its positioning hole correspond to the hole of the main deck assembly.

(3) When re-engaging the control cam,lower the capstan brake assembly while setting it so as to make its positioning hole correspond to the hole of the main deck assembly.

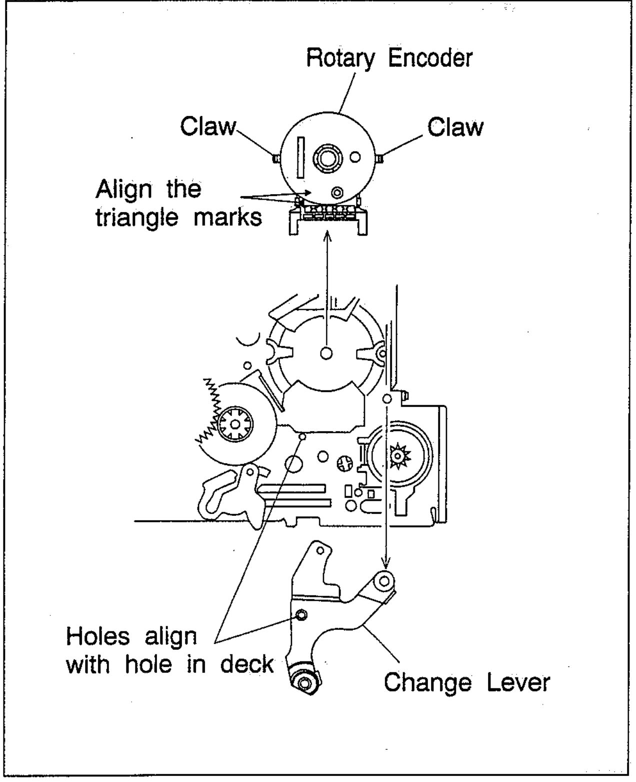

Rotary Encoder
Claw
Claw
Align the triangle marks
Holes align with hole in deck
Change Lever

Fig. 2-6-2

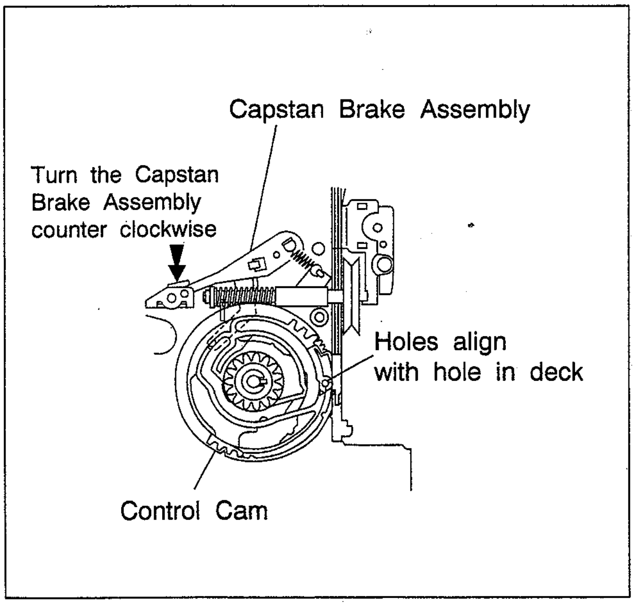

Capstan Brake Assembly
Turn the Capstan Brake Assembly counter clockwise
Holes align with hole in deck
Control Cam

Fig. 2-6-3

2.6.4 Slide Plate

(1) Lower both the main brake assembly (supply and take-up) untill they touch the edge of the main deck assembly while reinstalling the slide plate so as to make the respective positioning holes of the main brake assembly correspond to the holes on the main deck assembly.

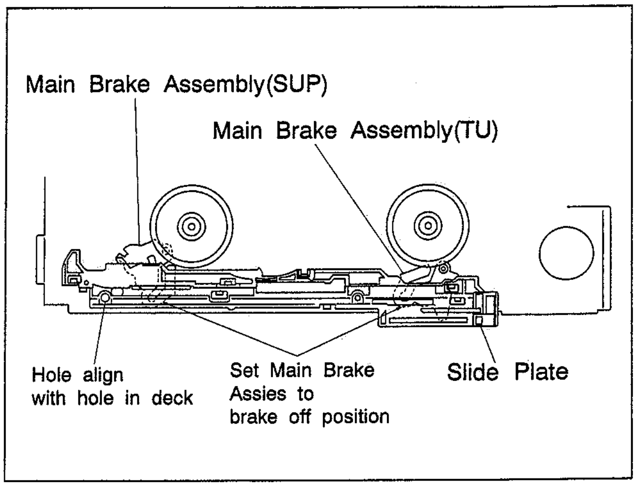

Main Brake Assembly(SUP)
Main Brake Assembly(TU)
Hole align with hole in deck
Set Main Brake Assies to brake off position
Slide Plate

Fig.2-6-4

2.6.5 Control Plate

(1) Reinstall the control plate so as to set the two positioning holes of it on the holes on the main deck assembly respectively and to set the positioning hole of the take-up lever on the hole of the main deck at the same time. When adjusting the hole position of the take-up lever,use a pair of tweezers to hold and move it since it is pulled by a tension spring.

(2) After reinstalling the control plate,fix it with the slit washer,control bracket and control bracket-2.

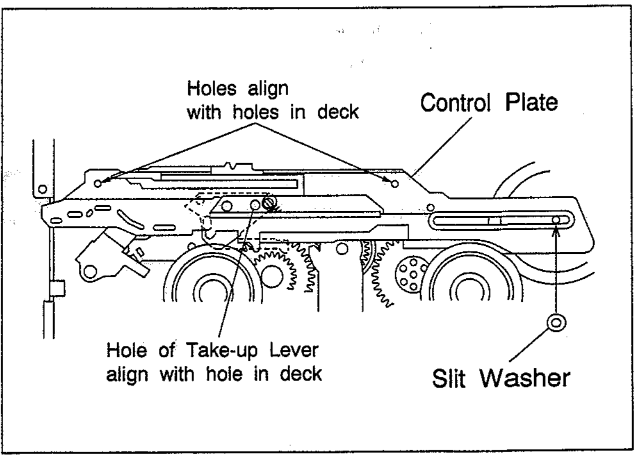

Holes align with holes in deck
Control Plate
Hole of Take-up Lever align with hole in deck
Slit Washer

Fig. 2-6-5

2.7 TAPE INTERCHANGEABILITY ADJUSTMENT

NOTE :
- *This adjustment is extremely important. However, it is normally not required during routine service. Perform only after replacing major components(A/C head,upper/lower drum assembly,pole base assembly,etc).*
- *Before using costly alignment tape,use a spare tape and confirm correct operation of the tape transport.*

2.7.1 Tape pattern

(1) Connect the oscilloscope to TP106(PB FM/COL) on the Main board.Use TP111(D.FF) on the Main board as a trigger.

(2) Playback the SP stairstep portion of the alignment tape [MHP].Confirm that the FM waveform appears as indicated in Fig.2-7-1.

(3) Set the manual tracking position by simultaneously pressing the CH " ▲ " and " ▼ " buttons.

(4) Operate the tracking adjustment (press the CH buttons during playback) and set for maximum playback FM waveform.

(5) By operating the CH button,vary the FM waveform from maximum to minimum and vice versa to confirm that the waveform varies nearly in a flat shape as shown in Fig.2-7-1.

(6) When the FM waveform does not remain flat during this process,first slightly loosen the set screw located at the bottom of the guide rollers.Using the guide roller adjustment tool (Roller driver), adjust the supply and take-up guide rollers (refer to Fig.2-7-2) to obtain the correct waveform as indicated in Fig.2-7-3.

(7) By pressing the CH buttons several times,vary the FM waveform output from maximum to minimum (and vice versa) gradually,and confirm that the variation proceeds in flat shape, as shown in Fig.2-7-3.

(8) Next playback the EP stairstep portion of the alignment tape [MHP-L] and adjust the tracking control from maximum to minimum the FM waveform,confirm that FM waveform variation is always flat.

(9) Record the signal and play it back in both of the SP and EP mode,confirm that the FM waveform is flat in both mode.

(10) After adjustments,tighten the set screw of the guide rollers.

(11) Confirm that the tape wrinking does not occur at the roller upper or lower limits as indicated in Fig.2-7-4.

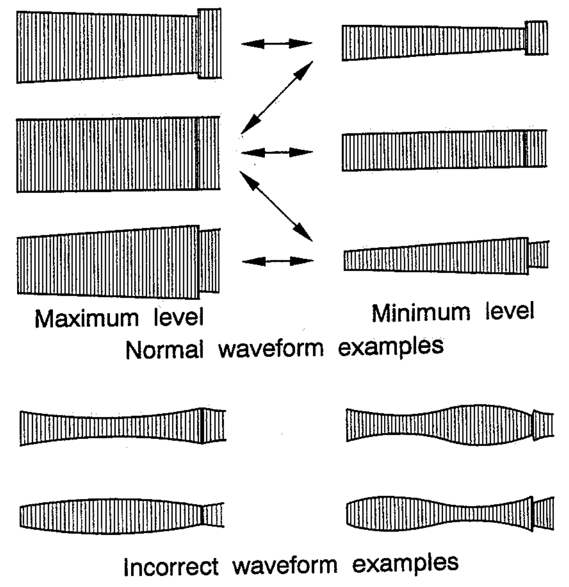


Fig. 2-7-1

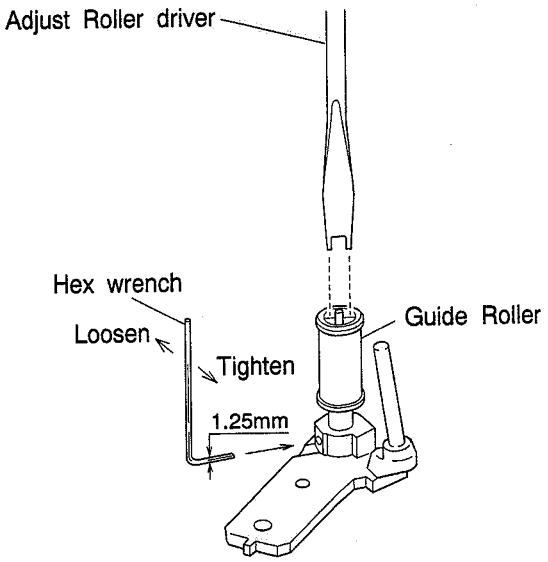


Fig. 2-7-2

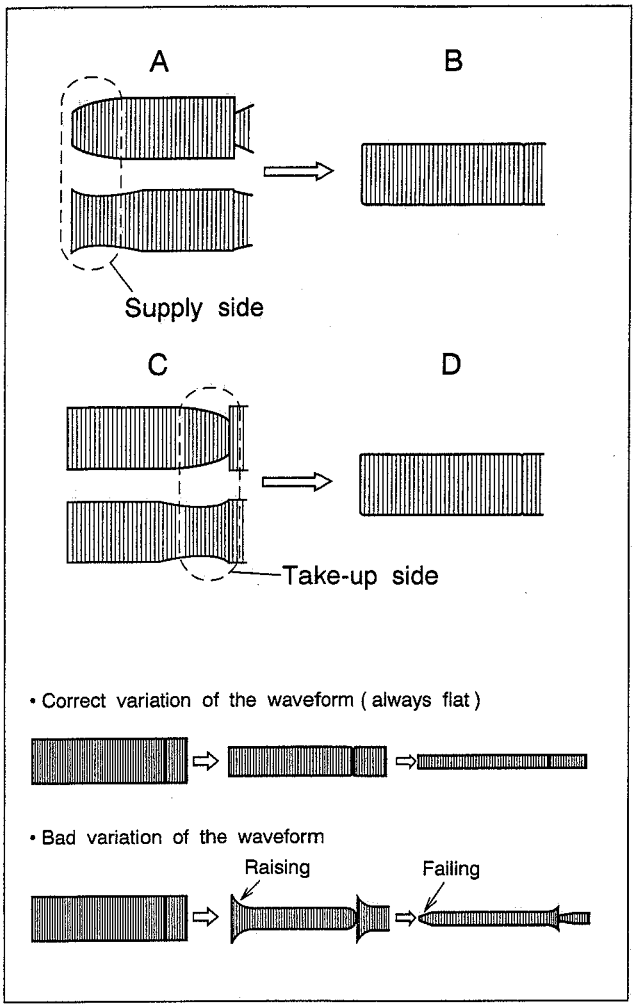

A
B
Supply side
C
D
Take-up side
• Correct variation of the waveform (always flat)
• Bad variation of the waveform
Raising
Failing

Fig. 2-7-3

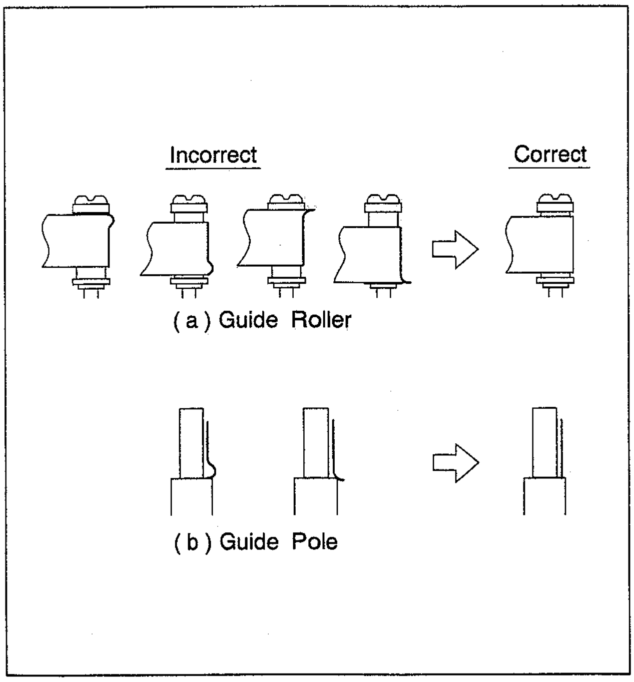

Incorrect
Correct
(a) Guide Roller
(b) Guide Pole

Fig. 2-7-4

2.7.2 A/C head height & azimuth

NOTE :
- *Temporarily set A/C head height as indicated in Fig. 2-5-4.*
- *Use spare tape to check the transport and confirm the tape is not scratched or damaged.*

1. Tilt

(1) Use spare tape and set for playback.
(2) Turn screw (3) clockwise to where the tape curls just slightly at the TU guide pole bottom flange as shown in Fig.2-7-5.
(3) Then slowly turn screw (3) counterclockwise to where the curling ceases.

2. Height

(1) Connect CH-1 of a dual trace oscilloscope to Audio Out.
(2) Connect CH-2 to TP1101(CTL. P) of the Main board assembly and use the ALT mode.
(3) Playback the SP stairstep portion of the alignment tape [MHP].
(4) Adjust screws (1),(2) and (3) for maximum audio output and control pulse level.

3. Azimuth

(1) Connect the oscilloscope to Audio Out.
(2) Playback the SP stairstep portion of the alignment tape [MHP].
(3) Adjust screw (2) so that the audio output is both maximum and with minimum fluctuation.

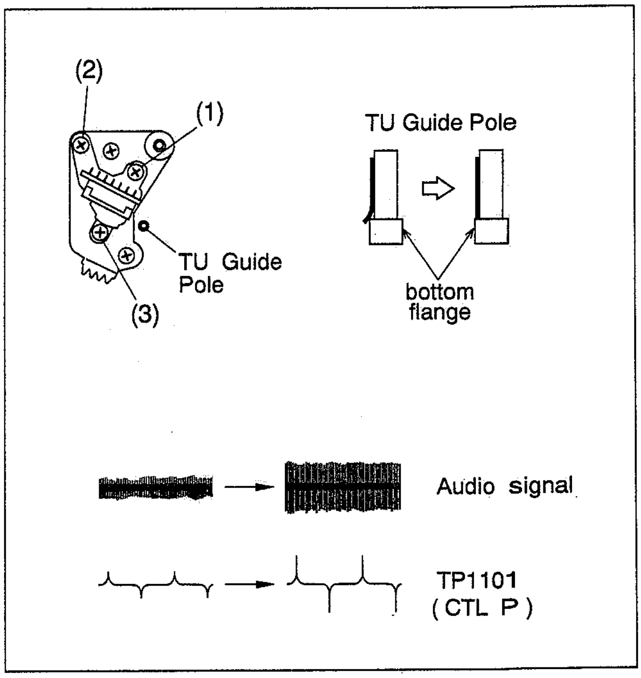

(2)
(1)
TU Guide Pole
(3)
TU Guide Pole
bottom flange
Audio signal
TP1101
(CTL P)

Fig. 2-7-5

2.7.3 A/C head phase(X-value)

(1) Connect the oscilloscope to TP106(PB FM/COL) on the Main board.Use TP111(D.FF) on the Main board as a trigger.

(2) Playback the SP stairstep portion of the alignment tape [MHP].

(3) Set the neutral manual tracking position by simultaneously pressing the CH " ▲ " and " ▼ " buttons.

(4) If adjustment is required,slightly loosen screws (4) and (5). Set A/C head positioning tool on the A/C head adjusting boss as indicated in Fig.2-7-6.

(5) Turn the tool first to position the A/C head fully toward the capstan. Then gradually return it toward the drum and stop at the position of maximum FM waveform output level as shown in Fig.2-7-7.

(6) Tighten screw (5). Remove the tool and tighten screw (4).

(7) Eject the SP alignment tape [MHP] and then re-insert the EP alignment tape [MHP-L].

(8) Playback the EP stairstep portion of the alignment tape [MHP-L].

(9) Set the neutral manual tracking position by simultaneously pressing the CH " ▲ " and " ▼ " buttons.

(10) Confirm maximum playback FM waveform output level as shown in Fig.2-7-7.

(11) If not maximum,slightly loosen the screws (4) and (5). Use the tool and adjust the head position for the nearest maximum point. Then tighten screws (4) and (5).

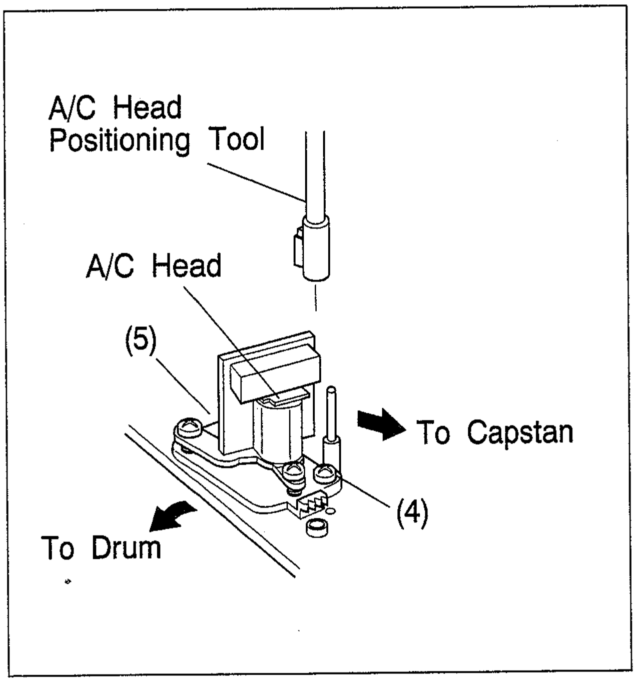


Fig. 2-7-6

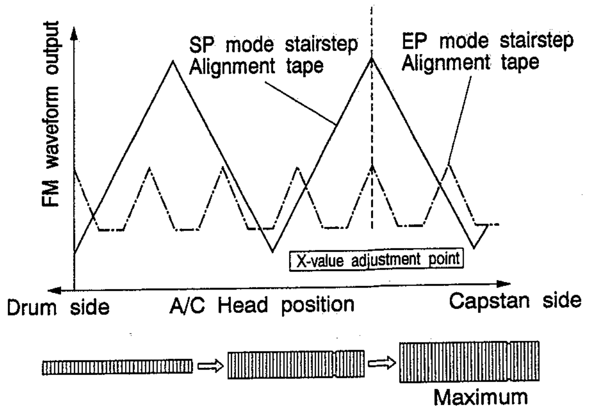


Fig. 2-7-7

2.7.4 EP mode auto tracking

NOTE : *Set VCR to the mode A by remote controller.*

(1) Connect the oscilloscope to TP106(PB FM/COL) on the Main board.Use TP111(D.FF) on the Main board as a trigger.

(2) Playback the EP stairstep portion of the alignment tape [MHP-L].

(3) Confirm the FM waveform of the oscilloscope screen until auto tracking action is over.

(4) Twice press button "D" of the presetting unit [PTU94008].

(5) If the alignment tape ejects automatically,repeat the A/C head phase adjustment (X-value).

2.7.5 Tension pole position

(1) Set for playback mode using MECHANISM SERVICE MODE(See SECTION 1 DISASSEMBLY).
(2) Turn the adjust pin so that the tension arm assembly does not touch ϕ2.5 pole on the outside.
(3) After adjustment,use the back tension cassette gauge and set for the playback mode.
(4) Confirm reading of 29 to 46 g-cm.

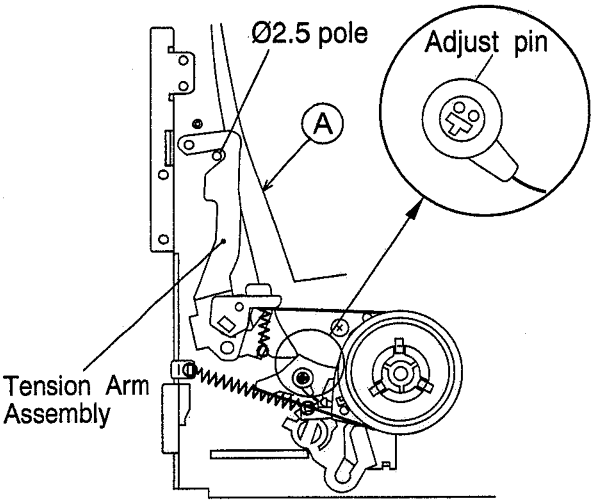

Ø2.5 pole
Adjust pin
Ⓐ
Tension Arm Assembly

Fig. 2-7-8

SECTION 3
ELECTRICAL ADJUSTMENT

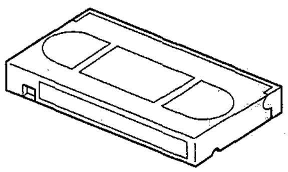
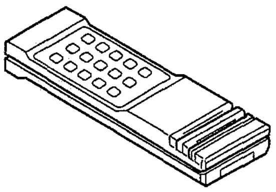
3.1 PRECAUTION

Electrical adjustment are required after replacing circuit components and certain mechanical parts. It is important to perform these adjustments only after all repairs and replacements have been completed. Also do not attempt these adjustments unless the proper equipments is available.

3.1.1 Required test equipment

① Color television or monitor
② Oscilloscope: wide-band,dual-trace,triggered delayed sweep
③ Frequency counter
④ Digital voltmeter
⑤ Signal generator: RF/IF sweep/maker
⑥ Signal generator: NTSC color bar, stairstep
⑦ Recording tape
⑧ Digit-key remote controller(provided)

3.1.2 Required adjustment tools

Alignment tape (SP,stairstep) MHP	Presetting unit PTU94008
	

3.1.3 Color bar signal,color bar pattern

- Color bar signal

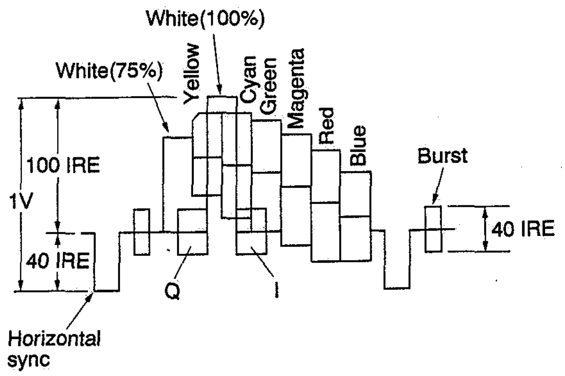

White(100%)
White(75%)
Yellow
Cyan
Green
Magenta
Red
Blue
Burst
100 IRE
1V
40 IRE
40 IRE
Q
I
Horizontal sync

Fig.3-1-1 Color bar signal waveform

- Color bar pattern

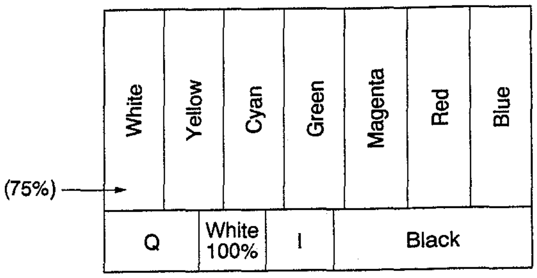

White
Yellow
Cyan
Green
Magenta
Red
Blue
(75%)
Q
White 100%
I
Black

Fig.3-1-2 Color bar pattern

3.2 SERVO CIRCUIT

Notes: • *Unless otherwise specified,all measurement point and adjustment parts are located on the MAIN BOARD.*
• *Set VCR to the mode A by remote controller.*

3.2.1 PB switching point

Signal	• Alignment tape [MHP],Stairstep
Mode	• PB,Automatic tracking OFF
Equipment	• Oscilloscope
Measurement point	• VIDEO OUT TERMINAL
Trigger slope (–)	• TP111(DRUM FF)
Adjustment tool	• Presetting unit [PTU94008]
Specification	• 6.5 ± 0.5H

(1) Connect an oscilloscope to VIDEO OUT TERMINAL and external trigger from TP111 (negative slope).
(2) Playback the stairstep signal of the alignment tape.
(3) Press the "O" button of the presetting unit.
(4) The adjustment is performed automatically. Once the adjustment is performed, the VCR will go into the STOP mode.

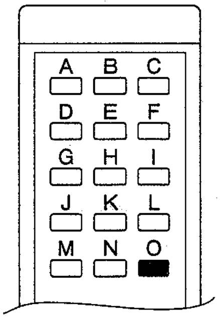


Fig.3-2-1 Presetting unit

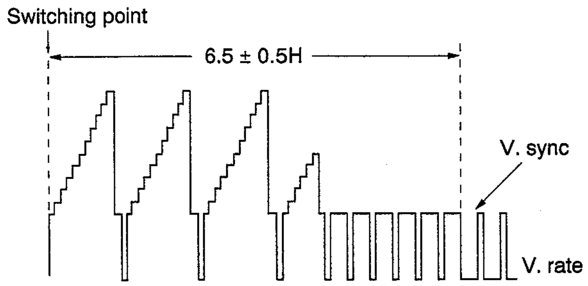


Fig.3-2-2 PB switching point

3.2.2 Slow tracking preset

Signal	• Tuner or color bar
Mode	• SP/EP, REC → PB(SLOW) Automatic tracking OFF
Equipment	• TV-Monitor
Adjustment tool	• Presetting unit [PTU94008]
Specification	• Minimum noise

Note : *Set VCR to the mode A by remote controller. Use only buttons "B" and "C", depressing other buttons during adjustment may cause adjustment errors.*

(1) Record a color bar signal in the SP mode.
(2) Playback recorded signal on the FWD slow mode.
(3) Set the tracking control to the center position by simultaneously pressing the CH " ▲ " and " ▼ " buttons.
(4) Observe the display on the TV monitor and adjust for optimum noise condition (best tracking) by depressing "B " or "C " buttons of the presetting unit.
(5) Depress the STOP button.
(6) Confirm that the bar noise is not visible on the TV monitor in the slow mode.
(7) Repeat steps (2) to (6) in REV slow mode.
(8) Repeat steps (1) to (7) in EP mode.

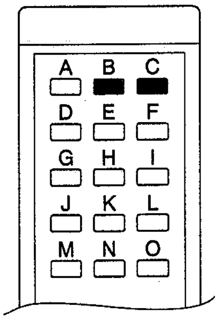


Fig.3-2-3 Presetting unit

3.3 SYSCON CIRCUIT

Notes:
- *Unless oterwise specified,all measurement point and adjustment parts are located on the MAIN BOARD.*
- *When perform this adjustment,remove the MECHANISM assembly.*

3.3.1 Timer clock

Signal	• No signal
Mode	• AC ON (POWER OFF)
Equipment	• Frequency counter
Measurement point	• IC701 pin 32
Adjustment part	• C730 (TIMER CLOCK)
Specification	• 16384.13 ± 0.01 Hz [61.03467 ± 0.00006 μsec]

(1) Connect the frequency counter to IC701 pin 32 and GND.
(2) Connect the short wire between IC701 pin 13 and GND.
(3) Short the leads of capacitor C709 once in order to reset IC701.
(4) Disconnect the short wire then connect it again quickly.
(5) Adjust C730 for 16384.13 ± 0.01 Hz.
(61.03467 ± 0.00006 μsec)

3.4 DEMODULATOR CIRCUIT

Notes:
- *Unless otherwise specified,all measurement point and adjustment parts are located on the MAIN BOARD.*
- *DEMODULATOR circuit adjustments are preformed by the EVR system by use of the presetting unit and digit-key remote controller.*
- *Unless otherwise specified,set an audio multiplex TV signal generator as follows;*
  RF signal : 70 dbu / 75 Ω,color bar 87.5% modulation.
- *Set VCR to the mode A by remote controller.*

3.4.1 Input level

Signal	• RF signal
Mode	• EE Tuner
Equipment	• Audio level meter
Measurement point	• IC1501- pin 26
Adjustment tool	• Presetting unit [PTU94008], Digit-key remote controller
EVR mode	• A : 20
Specification	• 500 ± 10 mVrms

(1) Connect an audio level meter to IC1501- pin 26.
(2) Set EVR mode by pressing "K" button of the presetting unit more than 3 seconds.
(3) Set "A : 20" pressing 2 and 0 digit keys of the remote controller.
(4) Set a signal generator mode to mono 300Hz.
(5) Adjust CH " ▲ " or " ▼ " button for 500 ± 10 mVrms.
(6) Set normal VCR mode by pressing "K" button of the presetting unit again so adjustment data is memorized.

3.4.2 Stereo VCO

Signal	• No signal
Mode	• EE Tuner
Equipment	• Frequency counter
Measurement point	• IC1501- pin 26
Adjustment tool	• Presetting unit [PTU94008], Digit-key remote controller
EVR mode	• A : 21
Specification	• 15.73 ± 0.1 KHz

(1) Connect a frequency counter to IC1501- pin 26.
(2) Set EVR mode by pressing "K" button of the presetting unit more than 3 seconds.
(3) Set "A : 21" pressing 2 and 1digit keys of the remote controller.
(4) Adjust CH " ▲ " or " ▼ " button for 15.73 ± 0.1 KHz.
(5) Set normal VCR mode by pressing "K" button of the presetting unit again so adjustment data is memorized.

3.4.3 Stereo filter

Signal	• No signal
Mode	• EE Tuner
Equipment	• Oscilloscope
Measurement point	• IC1501- pin 26
Adjustment tool	• Presetting unit [PTU94008], Digit-key remote controller
EVR mode	• A : 22
Specification	• Minimun level

(1) Connect an oscilloscope to IC1501- pin 26.
(2) Set EVR mode by pressing "K" button of the presetting unit more than 3 seconds.
(3) Set "A : 22" pressing 2digit key twice of the remote controller.
(4) Adjust CH " ▲ " or " ▼ " button for minimum level.
(5) Set normal VCR mode by pressing "K" button of the presetting unit again so adjustment data is memorized.

3.4.4 Separation - 1

Signal	• RF signal
Mode	• EE Tuner
Equipment	• Audio level meter
Measurement point	• IC1501- pin 26
Adjustment tool	• Presetting unit [PTU94008], Digit-key remote controller
EVR mode	• A : 23
Specification	• Minimum level

(1) Connect an audio level meter to IC1501- pin 26.
(2) Set EVR mode by pressing "K" button of the presetting unit more than 3 seconds.
(3) Set "A : 23" pressing 2 and 3 digit keys of the remote controller.
(4) Set a signal generator mode to alternate L-ch 300Hz 14% modulated.
(5) Adjust CH " ▲ " or " ▼ " button for minimum level.
(6) Set normal VCR mode by pressing "K" button of the presetting unit again so adjustment data is memorized.

3.4.5 Separation - 2

Signal	• RF signal
Mode	• EE Tuner
Equipment	• Audio level meter
Measurement point	• IC1501- pin 26
Adjustment tool	• Presetting unit [PTU94008], Digit-key remote controller
EVR mode	• A : 24
Specification	• Minimum level

(1) Connect an audio level meter to IC1501- pin 26.
(2) Set EVR mode by pressing "K" button of the presetting unit more than 3 seconds.
(3) Set "A : 24" pressing 2 and 4 digit keys of the remote controller.
(4) Set a signal generator mode to alternate L-ch 5Hz 14% modulated.
(5) Adjust CH " ▲ " or " ▼ " button for minimum level.
(6) Set normal VCR mode by pressing "K" button of the presetting unit again so adjustment data is memorized.

3.4.6 SAP VCO

Signal	• No signal
Mode	• EE Tuner
Equipment	• Frequency counter
Measurement point	• IC1501- pin 26
Adjustment tool	• Presetting unit [PTU94008], Digit-key remote controller
EVR mode	• A : 25
Specification	• 78.67 ± 0.5 KHz

(1) Connect a frequency counter to IC1501- pin 26.
(2) Set EVR mode by pressing "K" button of the presetting unit more than 3 seconds.
(3) Set "A : 25" pressing 2 and 5 digit keys of the remote controller.
(4) Adjust CH " ▲ " or " ▼ " button for 78.67 ± 0.5 KHz.
(5) Set normal VCR mode by pressing "K" button of the presetting unit again so adjustment data is memorized.

3.5 VIDEO CIRCUIT

Notes: • *Unless otherwise specified, all measurement point and adjustment parts are located on the MAIN BOARD.*
• *Set VCR to the mode A by remote controller.*

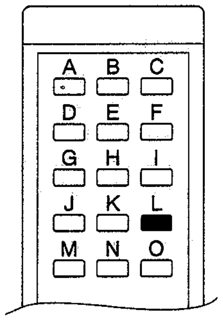


Fig.3-5-1 Presetting unit

3.5.1 Auto picture

Signal	• Monoscope
Mode	• Auto picture : OFF • REC then PB • SP/EP
Adjustment tool	• Presetting unit[PTU94008]
Specification	• STOP mode

(1) Record a monoscope signal in the SP mode.
(2) Playback the recorded signal.
(3) Press the "L" button of the presetting unit during playback.
(4) Confirm that VCR will go into the STOP mode.
(5) Repeat steps (2) to (4) in the EP mode.

SECTION 4
CHARTS AND DIAGRAMS

NOTES OF SCHEMATIC DIAGRAM

Safety precautions
The Components identified by the symbol ⚠ are critical for safety. For continued safety, replace safety critical components only with manufactures recommended parts.

1. Units of components on the schematic diagram

Unless otherwise specified.

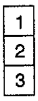
1) All resistance values are in ohm, 1/6 W, 1/8 W (refer to parts list).
   Chip resistors are 1/16 W.
   K: KΩ (1000Ω), M: MΩ (1000KΩ)
2) All capacitance values are in μF, (P: PF).
3) All inductance values are in μH, (m: mH).
4) All diodes are 1SS133, MA165 or IN4148M (refer to parts list).

2. Indications of control voltage

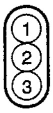
AUX : Active only at high

$\overline{\text{AUX}}$ or AUX(L) : Active at low

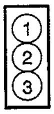
3. Interpreting Connector indications



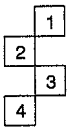
Removable connector



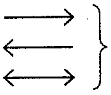
Wire soldered directly on board



Non-removable Board connector



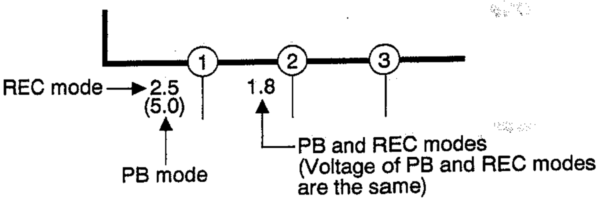
Board to Board



Connected pattern on board

4. Voltage measurement

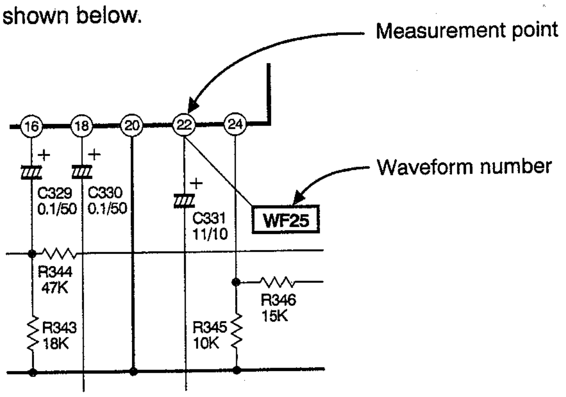
1) Video circuits
   REC : Colour bar signal in SP mode, normal VHS mode
   PB : Alignment tape, colour bar SP mode, normal VHS mode
   — : Unmeasurable or unnecessary to measure
2) Audio circuits
   REC : 1KHz, –8 dBs sine wave signal in SP mode, Normal VHS mode
   PB : REC then playback it
3) Movie Camera circuits
   Measured using a correctly illuminated gray scale or colour bar test charts in the E-E mode
4) Indication on schematic diagram
   Voltage Indications for REC and PB mode on the schematic diagram are as shown below.


①
②
③
REC mode
2.5
(5.0)
1.8
PB mode
PB and REC modes
(Voltage of PB and REC modes are the same)

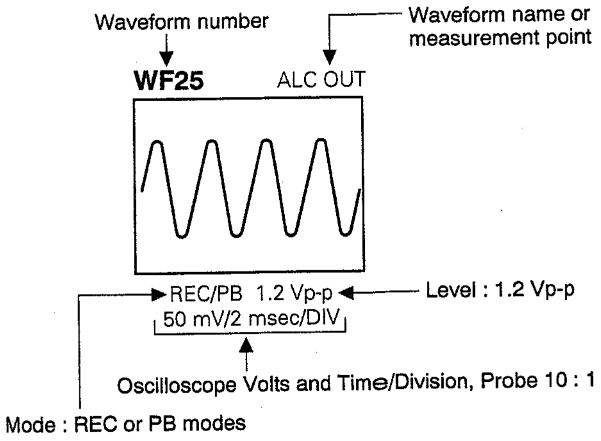
Note: If the voltages are not indicated on the schematic diagram, refer to the voltage charts.

5. Waveform measurement

1) Video circuits
   REC : Colour bar signal in SP mode, normal VHS mode
   PB : Alignment tape, colour bar SP mode, normal VHS mode
2) Audio circuits
   REC : 1KHz, –8 dBs sine wave signal in SP mode, normal VHS mode
   PB : REC then playback it
3) Movie Camera circuits
   Measured using a correctly illuminated gray scale or colour bar test chatrs in the E-E mode
4) Indication on schematic diagram
   Waveform indications on the schematic diagram are as shown below.


Measurement point
Waveform number
⑯
⑱
⑳
㉒
㉔
C329
0.1/50
C330
0.1/50
C331
11/10
WF25
R344
47K
R343
18K
R345
10K
R346
15K

5) Waveform indications


Waveform number
Waveform name or measurement point
WF25
ALC OUT
REC/PB 1.2 Vp-p
Level : 1.2 Vp-p
50 mV/2 msec/DIV
Oscilloscope Volts and Time/Division, Probe 10 : 1
Mode : REC or PB modes

6. Signal path Symbols

The arrows indicate the signal path as follows.

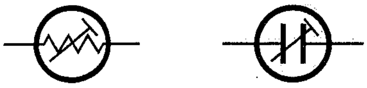
⇨	Playback signal path
➧	Playback and recording signal path
➡	Recording signal path (including E-E signal path)
⇨▷	Capstan servo path
➡▶	Drum servo path

(Example)

⇨ R-Y	Playback R-Y signal path
➡ Y	Recording Y signal path

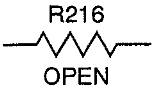
7. Indication of the parts for adjustments

The parts for the adjustments are surrounded with the circle as shown below.



8. Indication of the parts not mounted on the circuit board

"OPEN" is indicated by the parts not mounted on the circuit board.



CIRCUIT BOARD NOTES

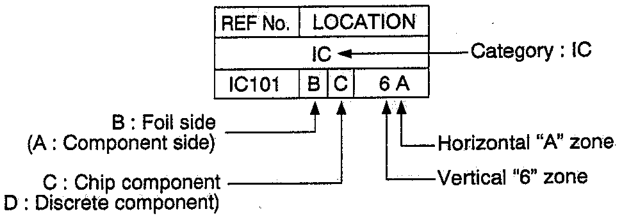
1. Foil and Component sides

1) Foil side (B side) :
Parts on the foil side seen from foil face (pattern face) are indicated.

2) Component side (A side) :
Parts on the component side seen from component face (parts face) indicated.

2. Parts location guides

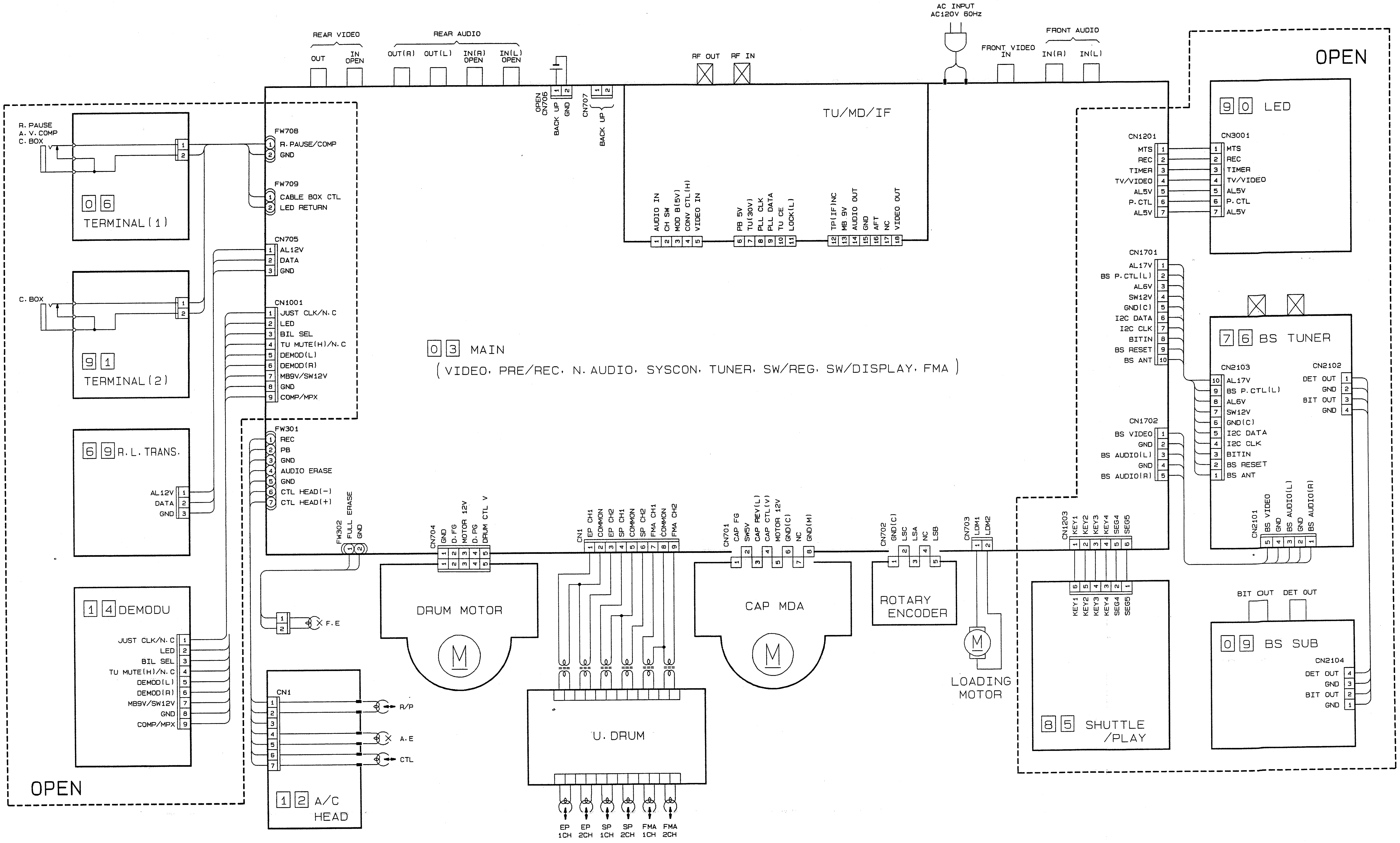
Parts location are indicated by guide scale on the circuit board.


REF No.
LOCATION
IC
Category : IC
IC101
B
C
6 A
B : Foil side
(A : Component side)
C : Chip component
D : Discrete component)
Horizontal "A" zone
Vertical "6" zone

Note:

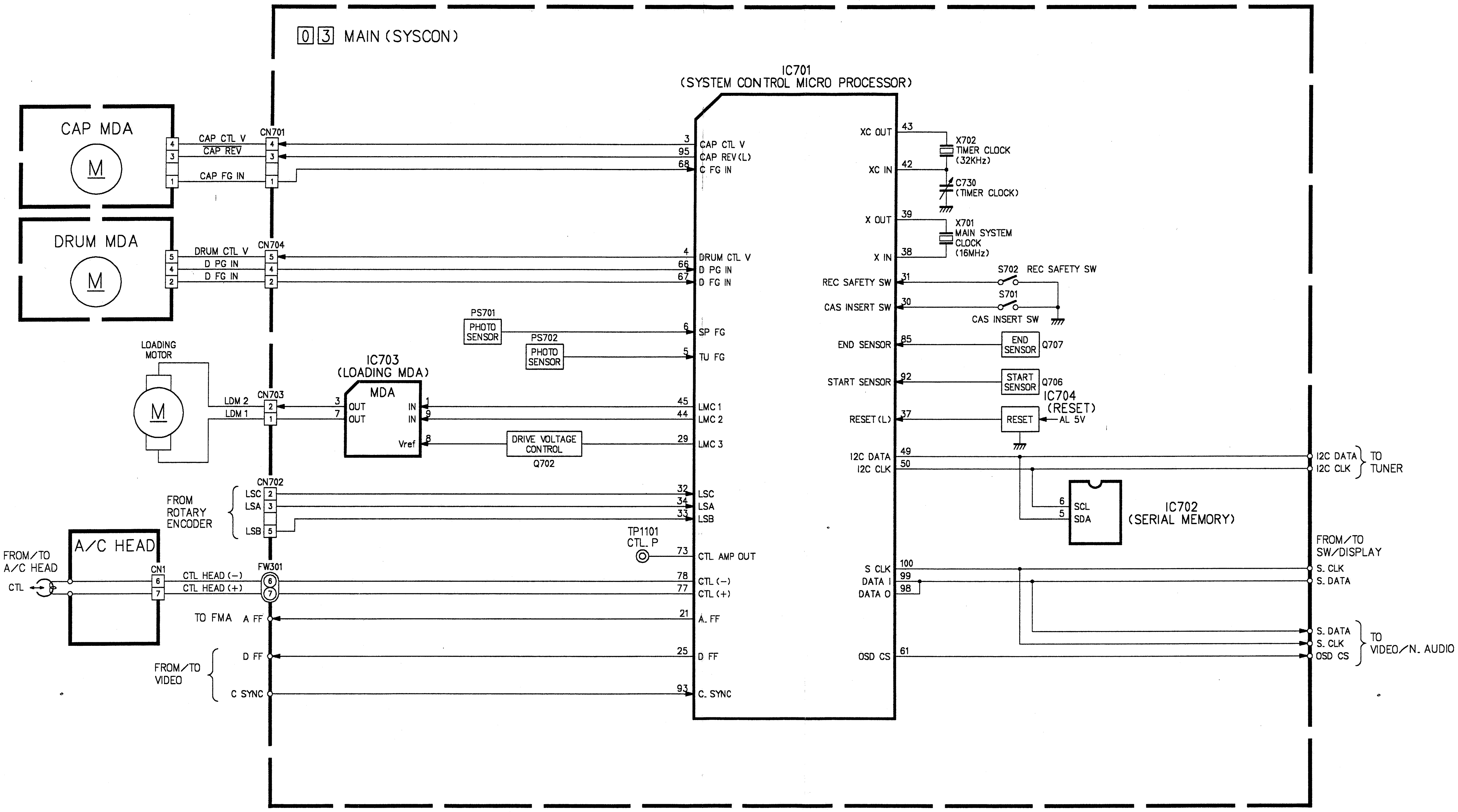
For general information in service manual, please refer to the Service Manual of GENERAL INFORMATION Edition 4 No. 82054D (January 1994).

4.1 BOARD INTERCONNECTIONS


REAR VIDEO
OUT
IN OPEN
REAR AUDIO
OUT(R)
OUT(L)
IN(R) OPEN
IN(L) OPEN
OPEN CN706
BACK UP
GND
CN707
BACK UP
RF OUT
RF IN
AC INPUT AC120V 60Hz
FRONT VIDEO IN
FRONT AUDIO
IN(R)
IN(L)
OPEN
TU/MD/IF
AUDIO IN
CH SW
MOD B(5V)
CONV CTL(H)
VIDEO IN
PB 5V
TU(30V)
PLL CLK
PLL DATA
TU CE
LOCK(L)
TP(IF)NC
MB 9V
AUDIO OUT
GND
AFT
NC
VIDEO OUT
R. PAUSE
A. V. COMP
C. BOX
06 TERMINAL(1)
C. BOX
91 TERMINAL(2)
69 R. L. TRANS.
AL12V
DATA
GND
14 DEMODU
JUST CLK/N. C
LED
BIL SEL
TU MUTE(H)/N. C
DEMOD(L)
DEMOD(R)
MB9V/SW12V
GND
COMP/MPX
OPEN
FW708
R. PAUSE/COMP
GND
FW709
CABLE BOX CTL
LED RETURN
CN705
AL12V
DATA
GND
CN1001
JUST CLK/N. C
LED
BIL SEL
TU MUTE(H)/N. C
DEMOD(L)
DEMOD(R)
MB9V/SW12V
GND
COMP/MPX
FW301
REC
PB
GND
AUDIO ERASE
GND
CTL HEAD(-)
CTL HEAD(+)
03 MAIN
(VIDEO, PRE/REC, N. AUDIO, SYSCON, TUNER, SW/REG, SW/DISPLAY, FMA)
FW302
FULL ERASE
GND
F. E
CN1
R/P
A. E
CTL
12 A/C HEAD
CN704
GND
D. FG
MOTOR 12V
D. PG
DRUM CTL V
DRUM MOTOR
M
CN1
EP CH1
COMMON
EP CH2
SP CH1
COMMON
SP CH2
FMA CH1
COMMON
FMA CH2
U. DRUM
EP 1CH
EP 2CH
SP 1CH
SP 2CH
FMA 1CH
FMA 2CH
CN701
CAP FG
SW5V
CAP REV(L)
CAP CTL(V)
MOTOR 12V
GND(C)
NC
GND(M)
CAP MDA
M
CN702
GND(C)
LSC
LSA
NC
LSB
ROTARY ENCODER
CN703
LDM1
LDM2
M
LOADING MOTOR
CN1203
KEY1
KEY2
KEY3
KEY4
SEG4
SEG5
85 SHUTTLE /PLAY
CN1201
MTS
REC
TIMER
TV/VIDEO
AL5V
P. CTL
AL5V
90 LED
CN3001
MTS
REC
TIMER
TV/VIDEO
AL5V
P. CTL
AL5V
CN1701
AL17V
BS P. CTL(L)
AL6V
SW12V
GND(C)
I2C DATA
I2C CLK
BITIN
BS RESET
BS ANT
76 BS TUNER
CN2103
AL17V
BS P. CTL(L)
AL6V
SW12V
GND(C)
I2C DATA
I2C CLK
BITIN
BS RESET
BS ANT
CN2102
DET OUT
GND
BIT OUT
GND
CN1702
BS VIDEO
GND
BS AUDIO(L)
GND
BS AUDIO(R)
CN2101
BS VIDEO
GND
BS AUDIO(L)
GND
BS AUDIO(R)
BIT OUT
DET OUT
09 BS SUB
CN2104
DET OUT
GND
BIT OUT
GND

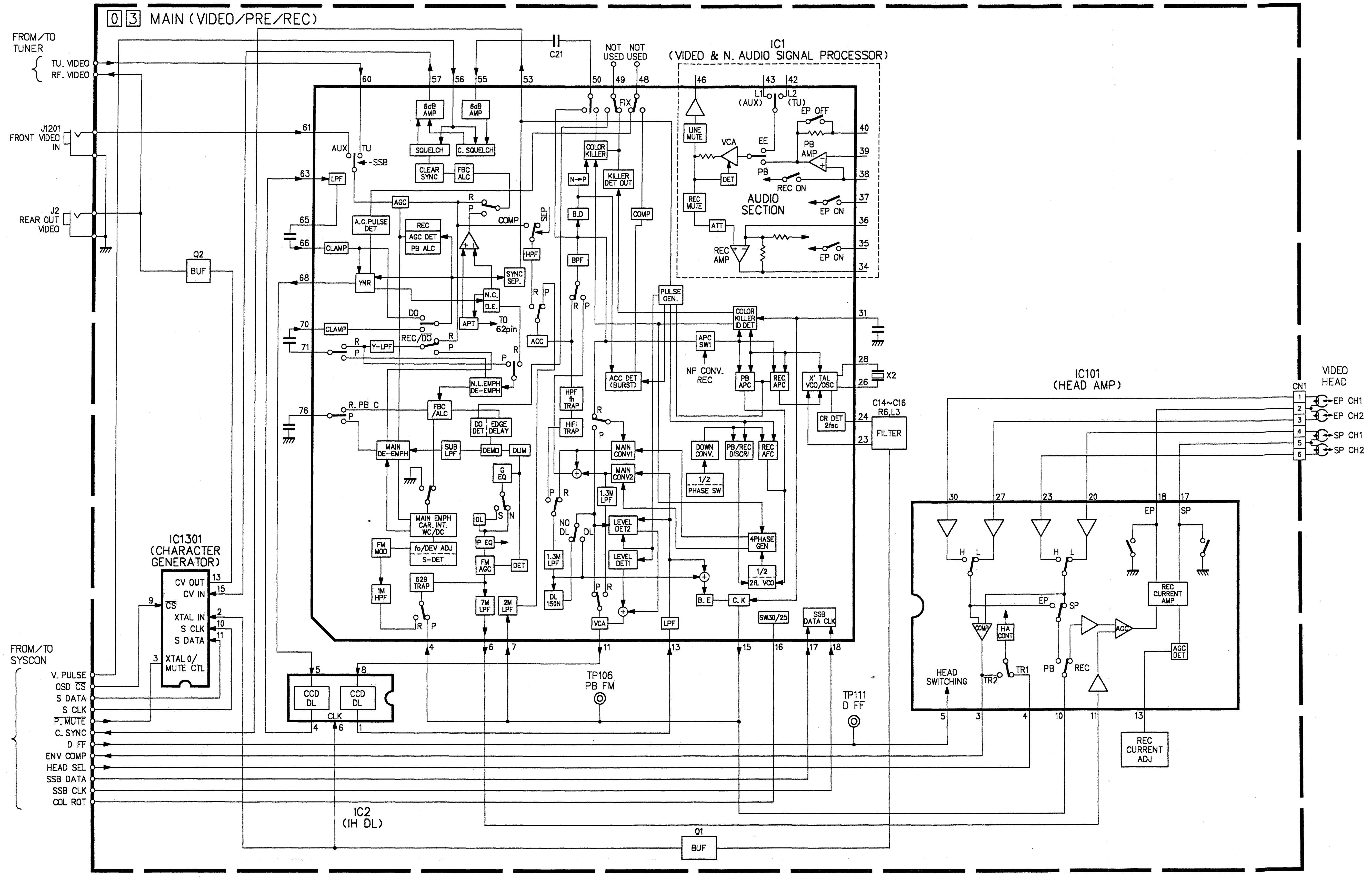
1 2	A/C HEAD
0 3	MAIN
NO	NAME

4.2 SYSTEM CONTROL BLOCK DIAGRAM

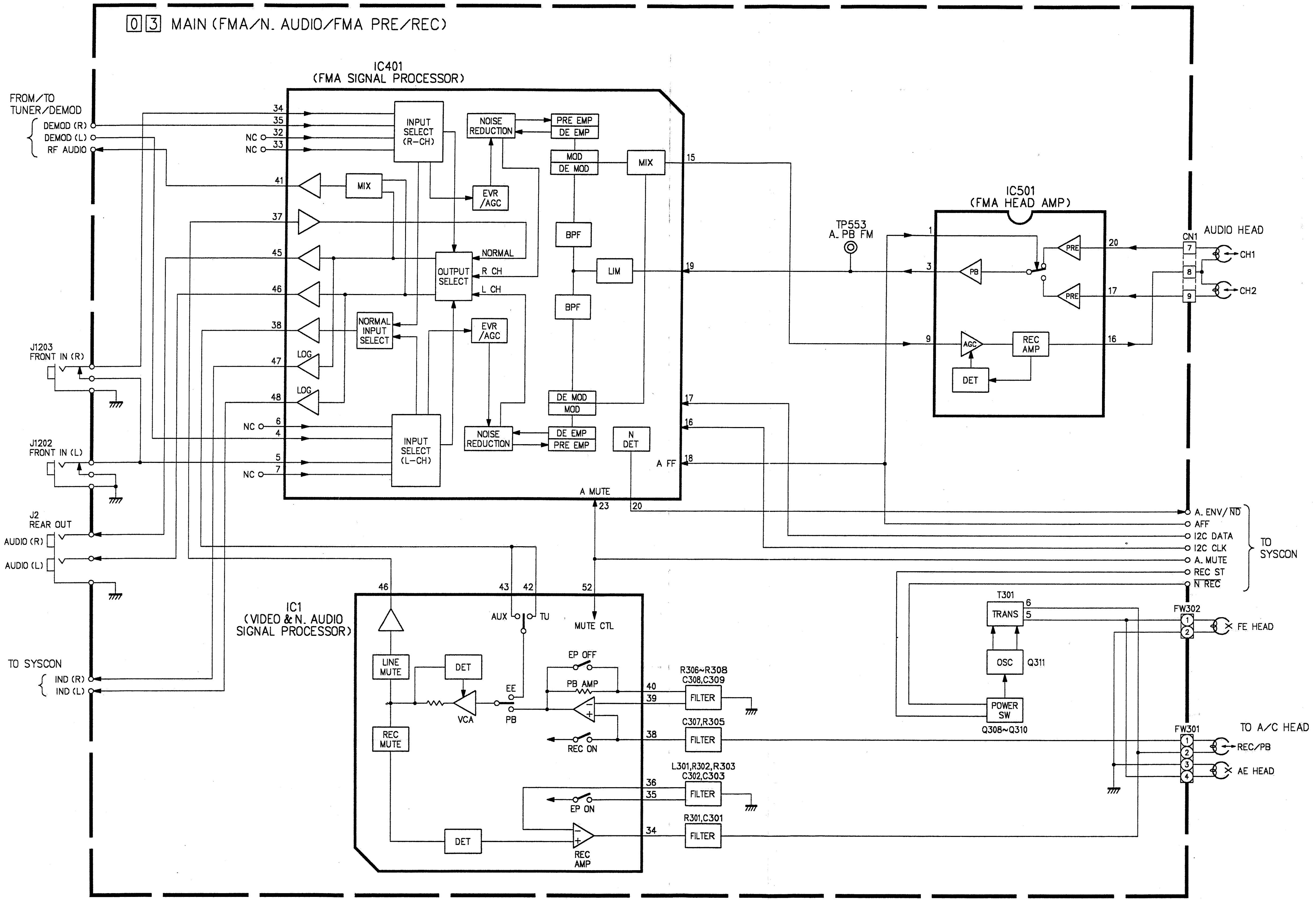


03 MAIN (SYSCON)
IC701
(SYSTEM CONTROL MICRO PROCESSOR)
CAP MDA
M
CAP CTL V
CAP REV
CAP FG IN
CN701
3 CAP CTL V
95 CAP REV(L)
68 C FG IN
DRUM MDA
M
DRUM CTL V
D PG IN
D FG IN
CN704
4 DRUM CTL V
66 D PG IN
67 D FG IN
PS701
PHOTO SENSOR
6 SP FG
PS702
PHOTO SENSOR
5 TU FG
LOADING MOTOR
M
LDM 2
LDM 1
CN703
IC703
(LOADING MDA)
MDA
OUT
OUT
IN
IN
Vref
45 LMC 1
44 LMC 2
DRIVE VOLTAGE CONTROL
Q702
29 LMC 3
CN702
FROM ROTARY ENCODER
LSC
LSA
LSB
32 LSC
34 LSA
33 LSB
TP1101
CTL. P
73 CTL AMP OUT
FROM/TO A/C HEAD
CTL
A/C HEAD
CN1
CTL HEAD (−)
CTL HEAD (+)
FW301
78 CTL (−)
77 CTL (+)
TO FMA
A FF
21 A. FF
FROM/TO VIDEO
D FF
25 D FF
C SYNC
93 C. SYNC
XC OUT 43
X702
TIMER CLOCK
(32KHz)
XC IN 42
C730
(TIMER CLOCK)
X OUT 39
X701
MAIN SYSTEM CLOCK
(16MHz)
X IN 38
REC SAFETY SW 31
S702 REC SAFETY SW
CAS INSERT SW 30
S701
CAS INSERT SW
END SENSOR 85
END SENSOR
Q707
START SENSOR 92
START SENSOR
Q706
IC704
(RESET)
RESET(L) 37
RESET
AL 5V
I2C DATA 49
I2C CLK 50
I2C DATA
I2C CLK
TO TUNER
SCL 6
SDA 5
IC702
(SERIAL MEMORY)
FROM/TO SW/DISPLAY
S CLK 100
DATA I 99
DATA O 98
S. CLK
S. DATA
S. DATA
S. CLK
OSD CS 61
OSD CS
TO VIDEO/N. AUDIO

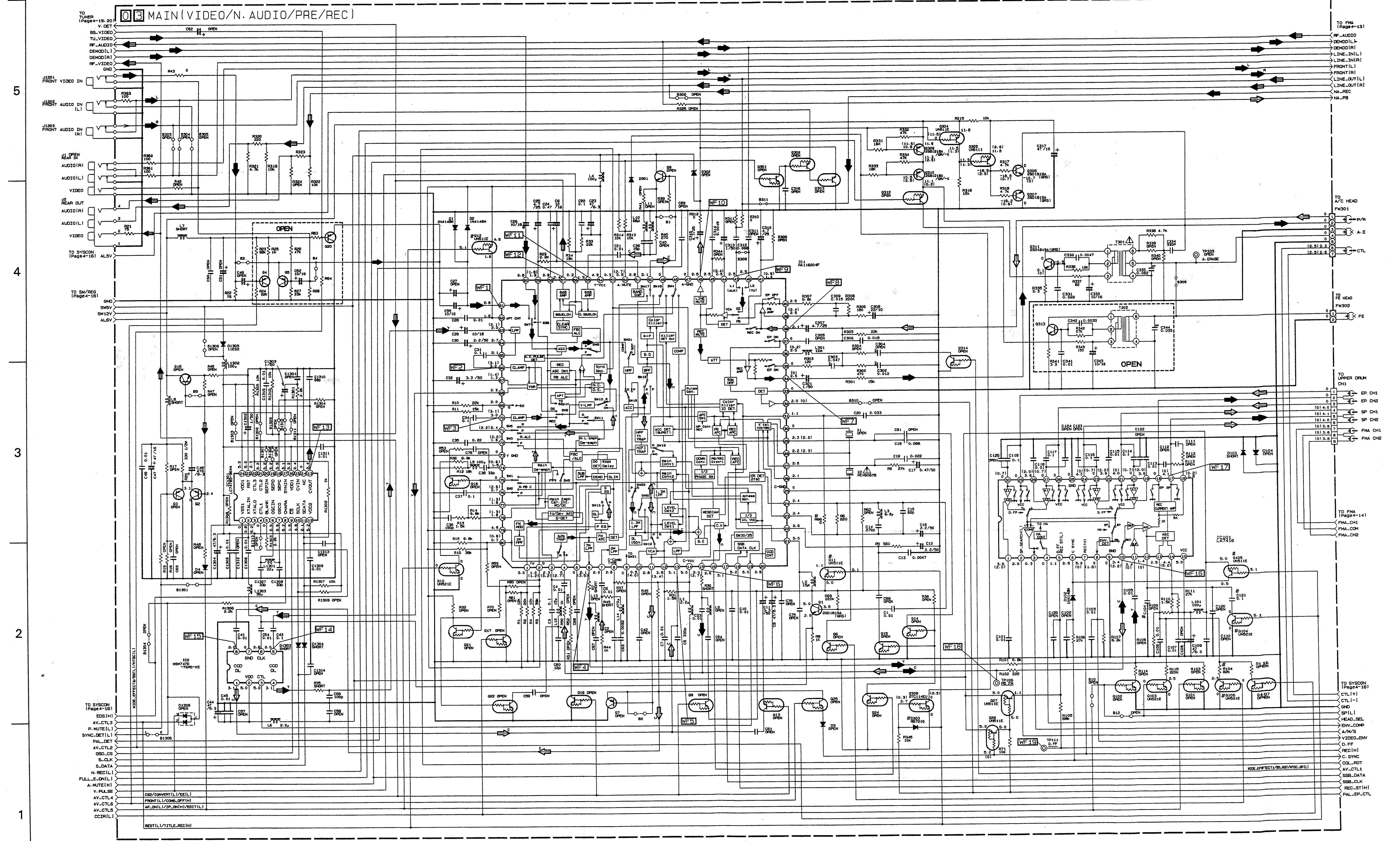
4.3 VIDEO BLOCK DIAGRAM


03 MAIN (VIDEO/PRE/REC)
FROM/TO TUNER
TU. VIDEO
RF. VIDEO
J1201 FRONT VIDEO IN
J2 REAR OUT VIDEO
Q2
BUF
IC1301 (CHARACTER GENERATOR)
CV OUT
CV IN
CS
XTAL IN
S CLK
S DATA
XTAL 0/ MUTE CTL
FROM/TO SYSCON
V. PULSE
OSD CS
S DATA
S CLK
P. MUTE
C. SYNC
D FF
ENV COMP
HEAD SEL
SSB DATA
SSB CLK
COL ROT
C21
NOT USED
NOT USED
IC1 (VIDEO & N. AUDIO SIGNAL PROCESSOR)
6dB AMP
SQUELCH
C. SQUELCH
CLEAR SYNC
FBC ALC
AUX
TU
SSB
LPF
AGC
A.C.PULSE DET
REC AGC DET
PB ALC
COMP
SEP
HPF
CLAMP
YNR
SYNC SEP.
N.C.
D.E.
DO
APT
TO 62pin
REC/DO
Y-LPF
ACC
N.L.EMPH DE-EMPH
R. PB C
FBC /ALC
DO DET
EDGE DELAY
MAIN DE-EMPH
SUB LPF
DEMO
DLIM
G EQ
MAIN EMPH CAR. INT. WC/DC
DL
FM MOD
fo/DEV ADJ
S-DET
P EQ
FM AGC
DET
1M HPF
629 TRAP
7M LPF
2M LPF
COLOR KILLER
N→P
KILLER DET OUT
B.D
BPF
COMP
FIX
HPF fh TRAP
HIFI TRAP
ACC DET (BURST)
MAIN CONV1
MAIN CONV2
1.3M LPF
NO DL
DL
LEVEL DET2
LEVEL DET1
1.3M LPF
DL 150N
VCA
LPF
PULSE GEN.
LINE MUTE
VCA
DET
EE
PB
L1 (AUX)
L2 (TU)
EP OFF
PB AMP
REC ON
REC MUTE
AUDIO SECTION
EP ON
ATT
REC AMP
COLOR KILLER ID DET
APC SW1
NP CONV. REC
PB APC
REC APC
X' TAL VCO/OSC
CR DET 2fsc
X2
DOWN CONV.
PB/REC DISCRI
REC AFC
1/2 PHASE SW
4PHASE GEN
1/2 2fL VCO
B. E
C. K
SW30/25
SSB DATA CLK
C14~C16 R6,L3
FILTER
IC2 (IH DL)
CCD DL
CCD DL
CLK
TP106 PB FM
TP111 D FF
Q1
BUF
IC101 (HEAD AMP)
EP
SP
H
L
REC CURRENT AMP
COMP
HA CONT
TR1
TR2
PB
REC
AGC
AGC DET
HEAD SWITCHING
REC CURRENT ADJ
CN1
VIDEO HEAD
EP CH1
EP CH2
SP CH1
SP CH2
6
5
4
3
2
1
A
B
C
D
E
F
G
H

4.4 AUDIO BLOCK DIAGRAM


03 MAIN (FMA/N. AUDIO/FMA PRE/REC)
IC401
(FMA SIGNAL PROCESSOR)
FROM/TO
TUNER/DEMOD
DEMOD (R)
DEMOD (L)
RF AUDIO
NC
NC
34
35
32
33
INPUT
SELECT
(R-CH)
NOISE
REDUCTION
PRE EMP
DE EMP
MOD
DE MOD
MIX
15
41
MIX
EVR
/AGC
37
45
46
38
47
48
LOG
LOG
NORMAL
R CH
L CH
OUTPUT
SELECT
NORMAL
INPUT
SELECT
EVR
/AGC
BPF
LIM
BPF
19
DE MOD
MOD
17
16
18
A FF
NC
6
4
5
7
NC
INPUT
SELECT
(L-CH)
NOISE
REDUCTION
DE EMP
PRE EMP
N
DET
A MUTE
23
20
J1203
FRONT IN (R)
J1202
FRONT IN (L)
J2
REAR OUT
AUDIO (R)
AUDIO (L)
TO SYSCON
IND (R)
IND (L)
TP553
A. PB FM
IC501
(FMA HEAD AMP)
1
3
9
PRE
PB
PRE
AGC
REC
AMP
DET
20
17
16
CN1
7
8
9
AUDIO HEAD
CH1
CH2
A. ENV/ND
AFF
I2C DATA
I2C CLK
A. MUTE
REC ST
N REC
TO
SYSCON
T301
6
5
TRANS
OSC
Q311
POWER
SW
Q308~Q310
FW302
1
2
FE HEAD
FW301
1
2
3
4
TO A/C HEAD
REC/PB
AE HEAD
IC1
(VIDEO & N. AUDIO
SIGNAL PROCESSOR)
46
43
42
52
AUX
TU
MUTE CTL
LINE
MUTE
DET
VCA
EE
PB
EP OFF
PB AMP
REC
MUTE
REC ON
EP ON
DET
REC
AMP
40
39
38
36
35
34
R306~R308
C308,C309
FILTER
C307,R305
FILTER
L301,R302,R303
C302,C303
FILTER
R301,C301
FILTER
A
B
C
D
E
F
G
H
1
2
3
4
5
6

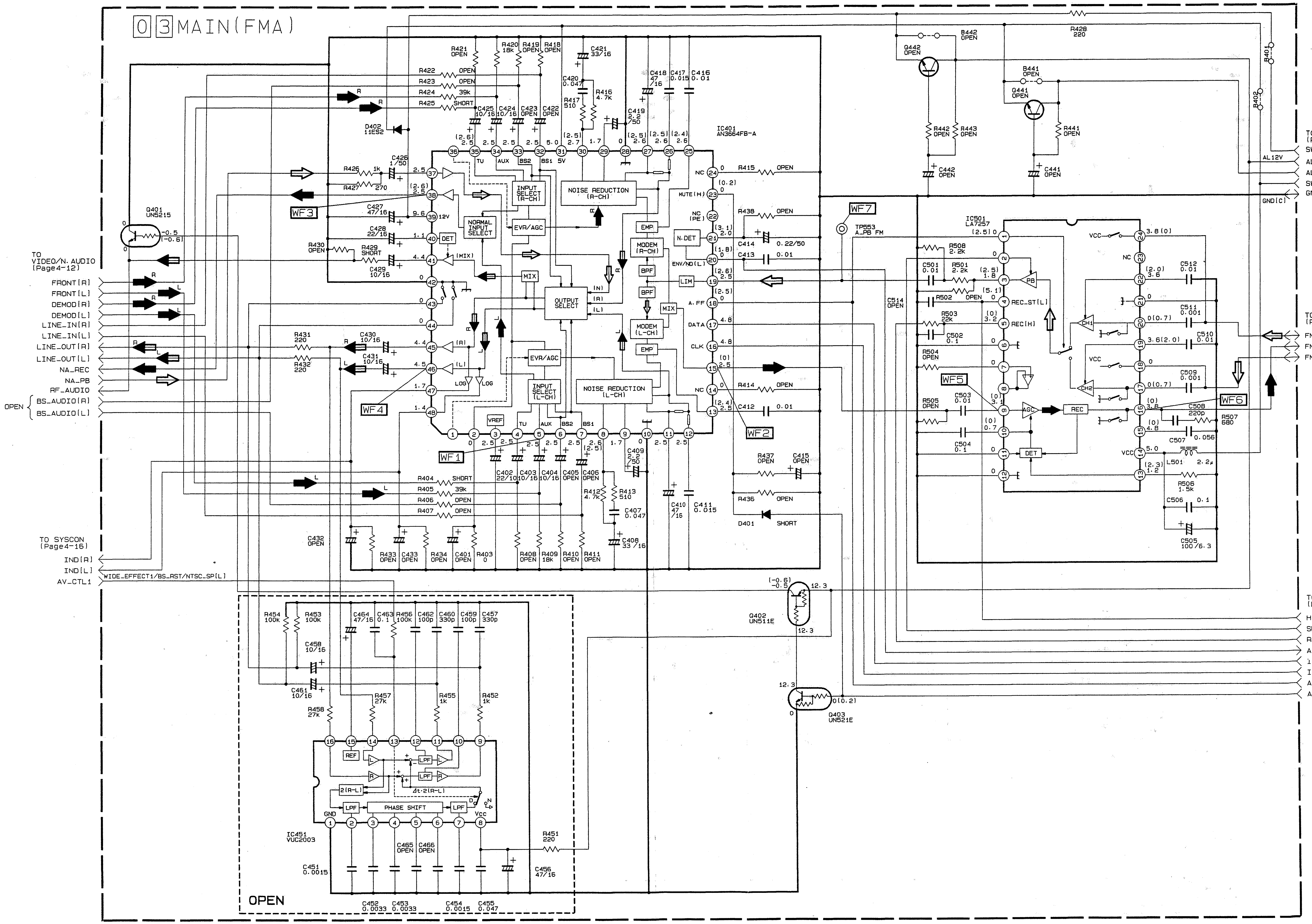
4.5 VIDEO, PRE/REC AND AUDIO SCHEMATIC DIAGRAM


03 MAIN(VIDEO/N.AUDIO/PRE/REC)
TO TUNER (Page4-19, 20)
V.DET
BS_VIDEO
TU_VIDEO
RF_AUDIO
DEMOD(L)
DEMOD(R)
RF_VIDEO
GND
J1201 FRONT VIDEO IN
J1202 FRONT AUDIO IN (L)
J1203 FRONT AUDIO IN (R)
J1 OPEN REAR IN
AUDIO(R)
AUDIO(L)
VIDEO
J2 REAR OUT
TO SYSCON (Page4-16) AL5V
TO SW/REG (Page4-18)
GND
SW5V
SW12V
AL6V
IC1 HA118204F
IC2 MSM7476-764S-XE
IC104 LA7416
TO FMA (Page4-13)
RF_AUDIO
DEMOD(L)
DEMOD(R)
LINE_IN(L)
LINE_IN(R)
FRONT(L)
FRONT(R)
LINE_OUT(L)
LINE_OUT(R)
NA_REC
NA_PB
TO A/C HEAD FW301
P/R
A·E
CTL
A·ERASE
TO FE HEAD FW302
FE
TO UPPER DRUM CN1
EP CH1
EP CH2
SP CH1
SP CH2
FMA CH1
FMA CH2
TO FMA (Page4-14)
FMA_CH1
FMA_COM
FMA_CH2
TO SYSCON (Page4-16)
CTL(+)
CTL(-)
GND
SP(L)
HEAD_SEL
ENV_COMP
A/M/S
VIDEO_ENV
D.FF
REC(H)
C.SYNC
COL_ROT
AV_CTL1
SSB_DATA
SSB_CLK
REC_ST(H)
PAL_EP_CTL
WIDE_EFFECT(L)/BS_RST/NTSC_SP(L)
TO SYSCON (Page4-16)
EDS(H)
AV_CTL3
P.MUTE(H)
SYNC_DET(L)
PAL_DET
AV_CTL2
OSD_CS
S_CLK
S_DATA
N.REC(L)
FULL_E_ON(L)
A.MUTE(H)
V.PULSE
AV_CTL4
AV_CTL6
AV_CTL5
CCIR(L)
CS2/CONVERT(L)/EE(L)
FRONT(L)/COMB_OFF(H)
AP_ON(L)/IP_ON(H)/EDIT(L)
BEST(L)/TITLE_REC(H)
WIDE_EFFECT/BS(L)/NTSC(L)
OPEN
WF1
WF2
WF3
WF4
WF5
WF6
WF7
WF8
WF9
WF10
WF11
WF12
WF13
WF14
WF15
WF16
WF17
WF18
WF19
A
B
C
D
E
F
G
H
1
2
3
4
5
6

NOTES : 1. For VIDEO.PRE/REC AND AUDIO waveforms.please refer to page4-23.
2. COMPARISON CHART OF MODELS & MARKS(#)

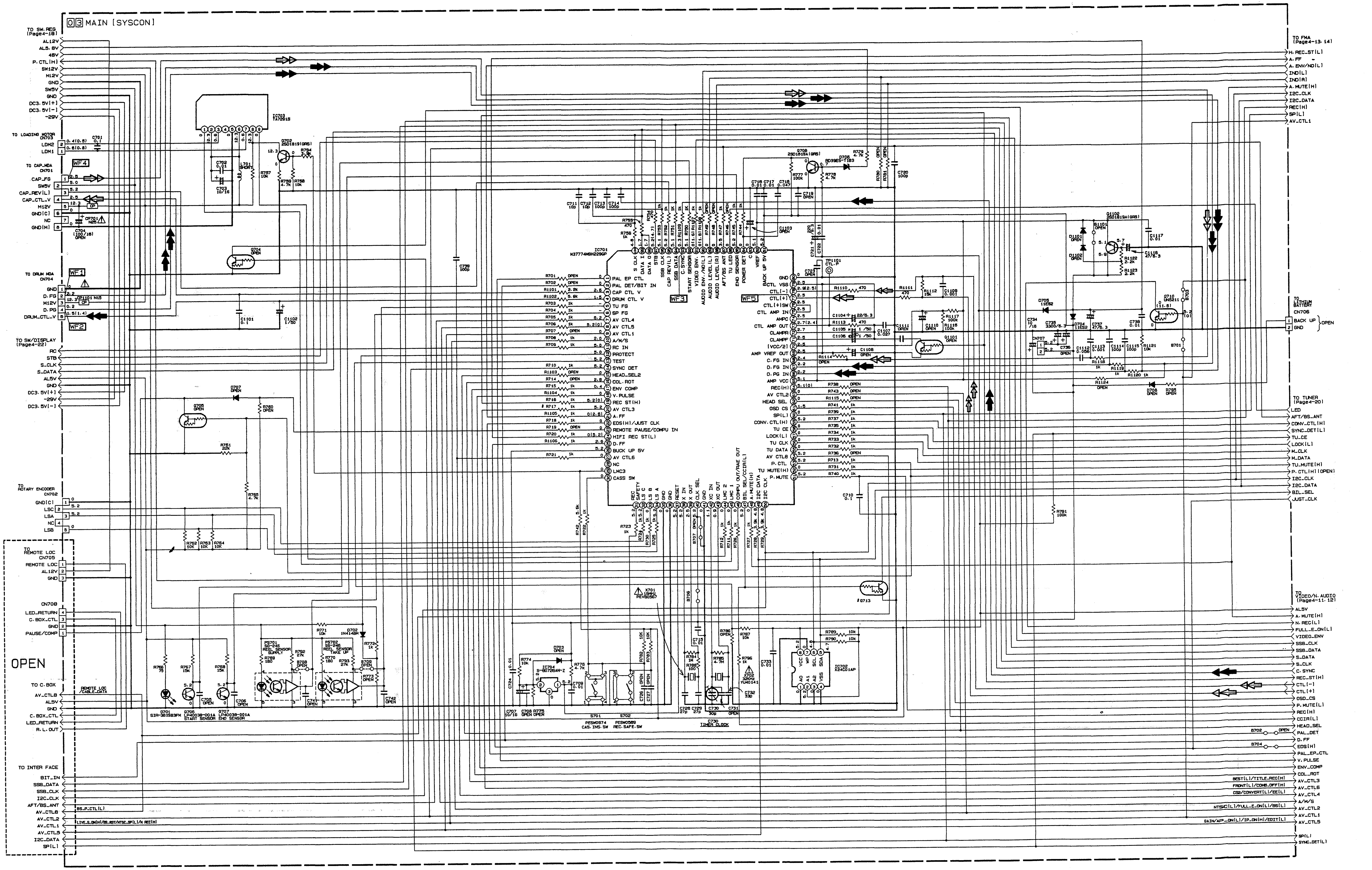
	REF. NO.	Q11	Q12	Q104	Q105	Q106	R66	R104	C104	C121	D303
MODEL	HR-A63U/J640U	OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	0.1	OPEN	OPEN
	HR-J643U	USED	USED	USED	USED	USED	USED	USED	0.0022	USED	USED

4.6 FMA SCHEMATIC DIAGRAM


03 MAIN(FMA)
IC401
AN3664FB-A
IC501
LA7257
IC451
VUC2003
Q401
UN5215
Q402
UN511E
Q403
UN521E
Q441
OPEN
Q442
OPEN
TO
VIDEO/N.AUDIO
(Page4-12)
FRONT(R)
FRONT(L)
DEMOD(R)
DEMOD(L)
LINE_IN(R)
LINE_IN(L)
LINE_OUT(R)
LINE_OUT(L)
NA_REC
NA_PB
RF_AUDIO
OPEN
BS_AUDIO(R)
BS_AUDIO(L)
TO SYSCON
(Page4-16)
IND(R)
IND(L)
AV_CTL1
WIDE_EFFECT1/BS_RST/NTSC_SP(L)
TO SW REG
(Page4-18)
SW12V
AL12V
AL5V
SW5V
GND
GND(C)
TO PRE/REC
(Page4-12)
FMA_CH1
FMA_COM
FMA_CH2
TO SYSCON
(Page4-16)
H.REC_ST(L)
SP(L)
REC(H)
A.ENV/ND(L)
I2C_DATA
I2C_CLK
A.FF
A.MUTE(H)
NOISE REDUCTION
(R-CH)
NOISE REDUCTION
(L-CH)
INPUT
SELECT
(R-CH)
INPUT
SELECT
(L-CH)
NORMAL
INPUT
SELECT
OUTPUT
SELECT
EVR/AGC
MIX
DET
EMP
MODEM
(R-CH)
MODEM
(L-CH)
BPF
LIM
N.DET
VREF
LOG
TU
AUX
BS2
BS1
5V
12V
NC
MUTE(H)
NC
(PE)
ENV/ND(L)
A.FF
DATA
CLK
REC_ST(L)
REC(H)
PB
CH1
CH2
AGC
REC
DET
VCC
REF
LPF
PHASE SHIFT
2(R-L)
Δt·2(R-L)
GND
Vcc
WF1
WF2
WF3
WF4
WF5
WF6
WF7
TP553
A_PB FM
OPEN
R421 OPEN
R420 18k
R419 OPEN
R418 OPEN
R422 OPEN
R423 OPEN
R424 39k
R425 SHORT
D402 11ES2
C421 33/16
C420 0.047
R417 510
R416 4.7k
C418 47/16
C417 0.015
C416 0.01
C419 2.2/50
C425 10/16
C424 10/16
C423 OPEN
C422 OPEN
R426 1k
R427 270
C426 1/50
C427 47/16
C428 22/16
R430 OPEN
R429 SHORT
C429 10/16
R431 220
R432 220
C430 10/16
C431 10/16
R415 OPEN
R438 OPEN
C414 0.22/50
C413 0.01
R414 OPEN
C412 0.01
R437 OPEN
C415 OPEN
R436 OPEN
D401 SHORT
R404 SHORT
R405 39k
R406 OPEN
R407 OPEN
C402 22/10
C403 10/16
C404 10/16
C405 OPEN
C406 OPEN
C409 2.2/50
R412 4.7k
R413 510
C407 0.047
C408 33/16
C410 47/15
C411 0.015
C432 OPEN
R433 OPEN
C433 OPEN
R434 OPEN
C401 OPEN
R403 0
R408 OPEN
R409 18k
R410 OPEN
R411 OPEN
B442 OPEN
B441 OPEN
R428 220
B401
B402
R442 OPEN
R443 OPEN
R441 OPEN
C442 OPEN
C441 OPEN
AL12V
R508 2.2k
C501 0.01
R501 2.2k
R502
C514 OPEN
R503 22k
C502 0.1
R504 OPEN
R505 OPEN
C503 0.01
C504 0.1
C512 0.01
C511 0.001
C510 0.01
C509 0.001
C508 220p
R507 680
C507 0.056
L501 2.2μ
R506 1.5k
C506 0.1
C505 100/6.3
R454 100k
R453 100k
C464 47/16
C463 0.1
R456 100k
C462 100p
C460 330p
C459 100p
C457 330p
C458 10/16
C461 10/16
R457 27k
R455 1k
R452 1k
R458 27k
R451 220
C451 0.0015
C465 OPEN
C466 OPEN
C456 47/16
C452 0.0033
C453 0.0033
C454 0.0015
C455 0.047
OPEN
A
B
C
D
E
F
G
H
1
2
3
4
5
6

NOTE : For FMA waveforms, please refer to page4-23.

4.7 SYSTEM CONTROL SCHEMATIC DIAGRAM

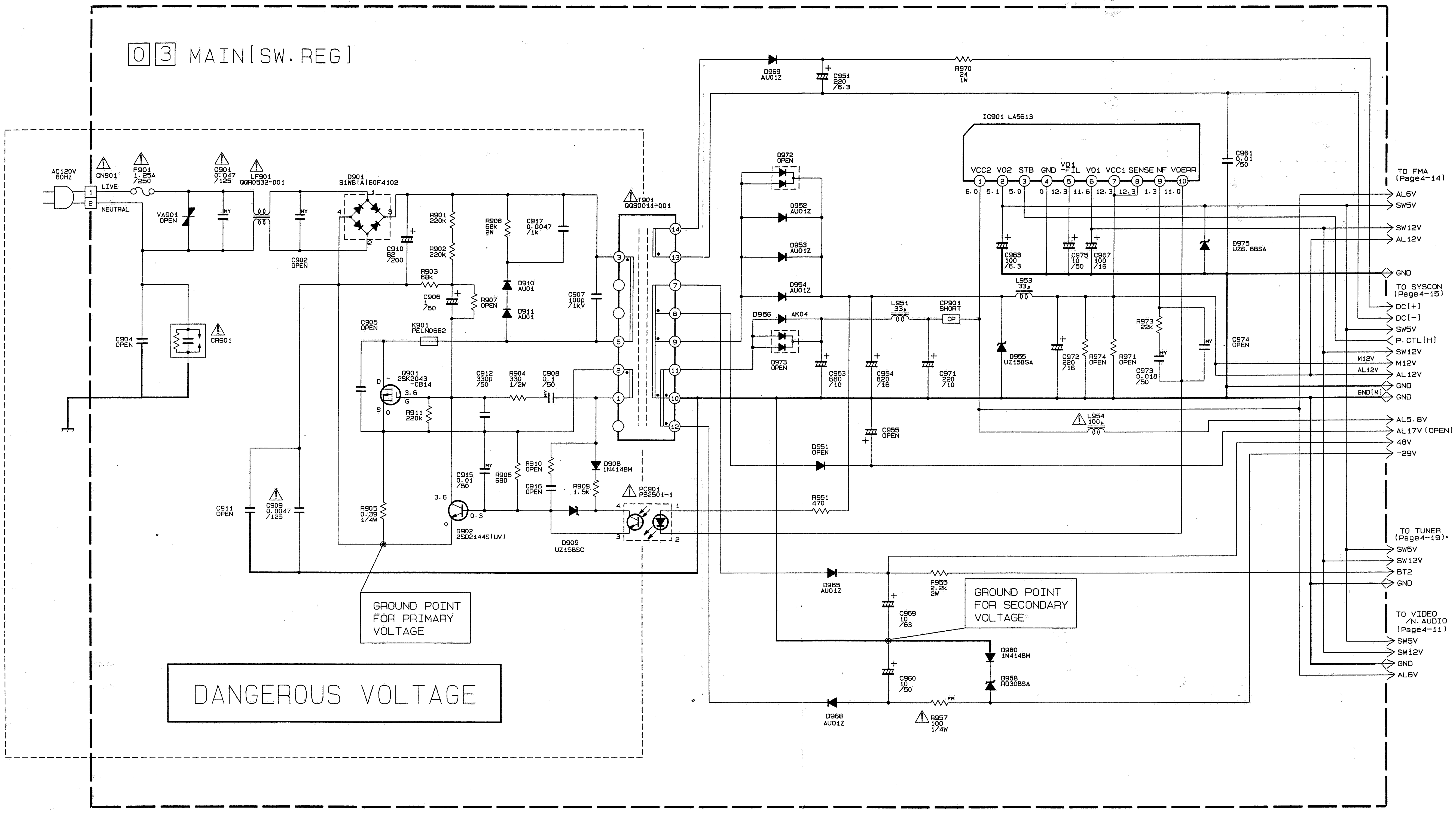

03 MAIN [SYSCON]
TO SW.REG (Page4-18)
AL12V
AL5.8V
48V
P.CTL(H)
SW12V
M12V
GND
SW5V
GND
DC3.5V(+)
DC3.5V(-)
-29V
TO LOADING MOTOR CN703
LDM2
LDM1
C701 0.1
TO CAP_MDA CN701
CAP_FG
SW5V
CAP_REV(L)
CAP_CTL_V
M12V
GND(C)
NC
GND(M)
CP701 N25
C704 (100/16) OPEN
WF4
WF1
WF2
WF3
WF5
TO DRUM MDA CN704
GND
D.FG
M12V
D.PG
DRUM_CTL_V
CP1101 N15
TO SW/DISPLAY (Page4-22)
RC
STB
S_CLK
S_DATA
AL5V
GND
DC3.5V(+)
-29V
DC3.5V(-)
TO ROTARY ENCODER CN702
GND(C)
LSC
LSA
NC
LSB
TO REMOTE LOC CN705
REMOTE LOC
AL12V
GND
CN708
LED_RETURN
C.BOX_CTL
GND
PAUSE/COMP
OPEN
TO C.BOX
AV_CTL8
AL5V
GND
C.BOX_CTL
LED_RETURN
R.L.OUT
REMOTE LOC /CABLE_DATA
TO INTER FACE
BIT_IN
SSB_DATA
SSB_CLK
I2C_CLK
AFT/BS_ANT
AV_CTL8
AV_CTL2
AV_CTL1
AV_CTL5
I2C_DATA
SP(L)
BS_P_CTL(L)
LIVE_S_ON(H)/BS_RST/NTSC_SP(L)/N REC(H)
IC703 TA7291S
Q702
R762 10K
R766 75
R767 15K
Q701 SIR-381SB3FM
Q706 LP4003B-001A START SENSOR
Q707 END SENSOR
IC701 M37774M8H229GP
1 PAL EP CTL
2 PAL DET/BIT IN
3 CAP CTL V
4 DRUM CTL V
5 TU FG
6 SP FG
7 AV CTL4
8 AV CTL5
9 AV CTL1
10 A/M/S
11 RC IN
12 PROTECT
13 TEST
14 SYNC DET
15 HEAD_SEL2
16 COL.ROT
17 ENV COMP
18 V.PULSE
19 REC ST(H)
20 AV CTL3
21 A.FF
22 EDS(H)/JUST CLK
23 REMOTE PAUSE/COMPU IN
24 HIFI REC ST(L)
25 D.FF
26 BUCK UP 5V
27 AV CTL6
28 NC
29 LMC3
30 CASS SW
31 REC SAFETY
32 LS C
33 LS B
34 LS A
35 GND
36 GND
37 RESET
38 X IN
39 X OUT
40 CLK SEL
41 GND
42 XC IN
43 XC OUT
44 LMC 2
45 LMC 1
46 COMPU OUT/RAE OUT
47 BIL SEL/CCIR(L)
48 A.MUTE(H)
49 I2C DATA
50 I2C CLK
51 P.MUTE
52 TU MUTE(H)
53 P.CTL
54 AV CTL8
55 TU DATA
56 TU CLK
57 LOCK(L)
58 TU CE
59 CONV.CTL(H)
60 SP(L)
61 OSD CS
62 HEAD SEL
63 AV CTL2
64 REC(H)
65 AMP VCC
66 D.PG IN
67 D.FG IN
68 C.FG IN
69 AMP VREF OUT
70 (VCC/2)
71 CLAMPF
72 CLAMPR
73 CTL AMP OUT
74 AMPC
75 CTL AMP IN
76 CTL(+)SW
77 CTL(+)
78 CTL(-)
79 CTL VSS
80 GND
81 BACK UP 5V
82 VREF
83 C
84 POWER DET
85 END SENSOR
86 TU LED
87 AFT/BS ANT
88 AUDIO LEVEL(R)
89 AUDIO LEVEL(L)
90 AUDIO ENV./ND(L)
91 VIDEO ENV.
92 START SENSOR
93 C.SYNC
94 SSB DATA
95 CAP REV(L)
96 SSB CLK
97 STB
98 DATA O
99 DATA I
100 S CLK
R701 OPEN
R702 OPEN
R1101 2.2k
R1102 5.6k
R703 1k
R704 1k
R705 1k
R706 1k
R707 OPEN
R708 1k
R709 1k
R710 1k
R1103 OPEN
R714 OPEN
R715 1k
R1104 1k
R716 1k
# R717 1k
R1105 1k
R718 1k
R719 OPEN
R720 1k
R1106 1k
R721 1k
R738 OPEN
R743 OPEN
R1115 OPEN
R741 1k
R739 1k
R737 1k
R735 1k
R734 1k
R733 1k
R732 1k
R736 OPEN
R713 1k
R731 1k
R740 1k
R1110 470
R1113 470
C1104 22/6.3
C1105 1/50
C1106 1/50
C1107 0.027
C1108 OPEN
R1114 OPEN
TP1101 CTL.P
C723 OPEN
C1103 OPEN
C710 0.1
R755 470
R756 1k
S701 PESW0574 CAS.INS.SW
S702 PESW0589 REC.SAFE.SW
C730 TIMER CLOCK
TO LITHIUM BATTERY CN706
BACK UP
GND
OPEN
TO FMA (Page4-13, 14)
H.REC_ST(L)
A.FF
A.ENV/ND(L)
IND(L)
IND(R)
A.MUTE(H)
I2C_CLK
I2C_DATA
REC(H)
SP(L)
AV_CTL1
TO TUNER (Page4-20)
LED
AFT/BS_ANT
CONV_CTL(H)
SYNC_DET(L)
TU_CE
LOCK(L)
M_CLK
M_DATA
TU_MUTE(H)
P.CTL(H)(OPEN)
I2C_CLK
I2C_DATA
BIL_SEL
JUST_CLK
TO VIDEO/N.AUDIO (Page4-11, 12)
AL5V
A.MUTE(H)
N.REC(L)
FULL_E_ON(L)
VIDEO_ENV
SSB_CLK
SSB_DATA
S_DATA
S_CLK
C.SYNC
REC_ST(H)
CTL(-)
CTL(+)
OSD_CS
P.MUTE(L)
REC(H)
CCIR(L)
HEAD_SEL
B702 OPEN
PAL_DET
D.FF
B704
EDS(H)
PAL_EP_CTL
V.PULSE
ENV_COMP
COL_ROT
BEST(L)/TITLE_REC(H)
AV_CTL3
FRONT(L)/COMB_OFF(H)
AV_CTL6
CS2/CONVERT(L)/EE(L)
AV_CTL4
A/M/S
NTSC(L)/FULL_E_ON(L)/BS(L)
AV_CTL2
AV_CTL1
GAIN/AP_ON(L)/IP_ON(H)/EDIT(L)
AV_CTL5
SP(L)
SYNC_DET(L)

NOTES : 1. For SYSCON waveforms, please refer to page4-23.

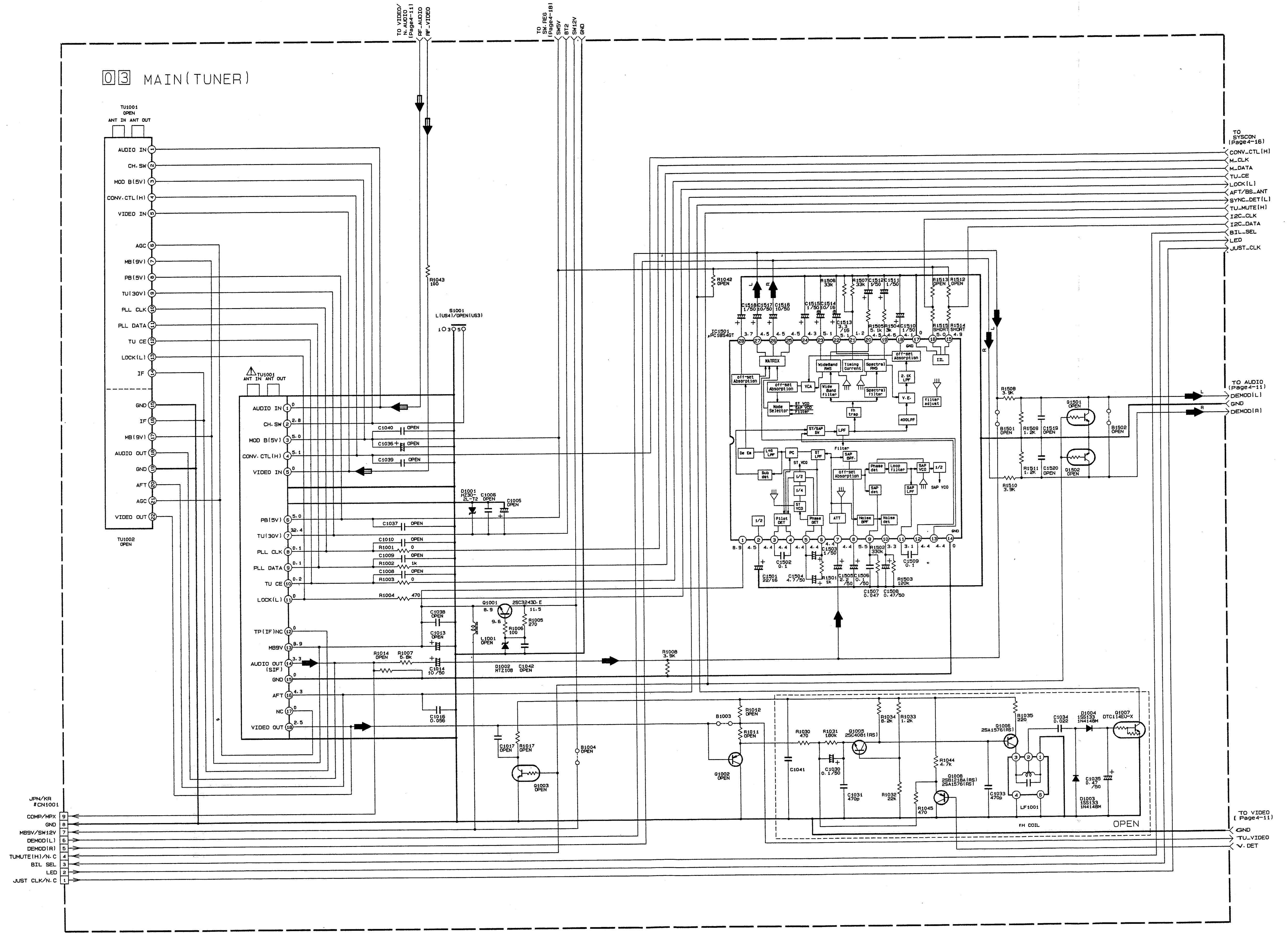
2. COMPARISON CHART OF MODELS & MARKS(#)

REF.NO.	MODELS	
	A63U/J640U	J643U
R717	OPEN	USED

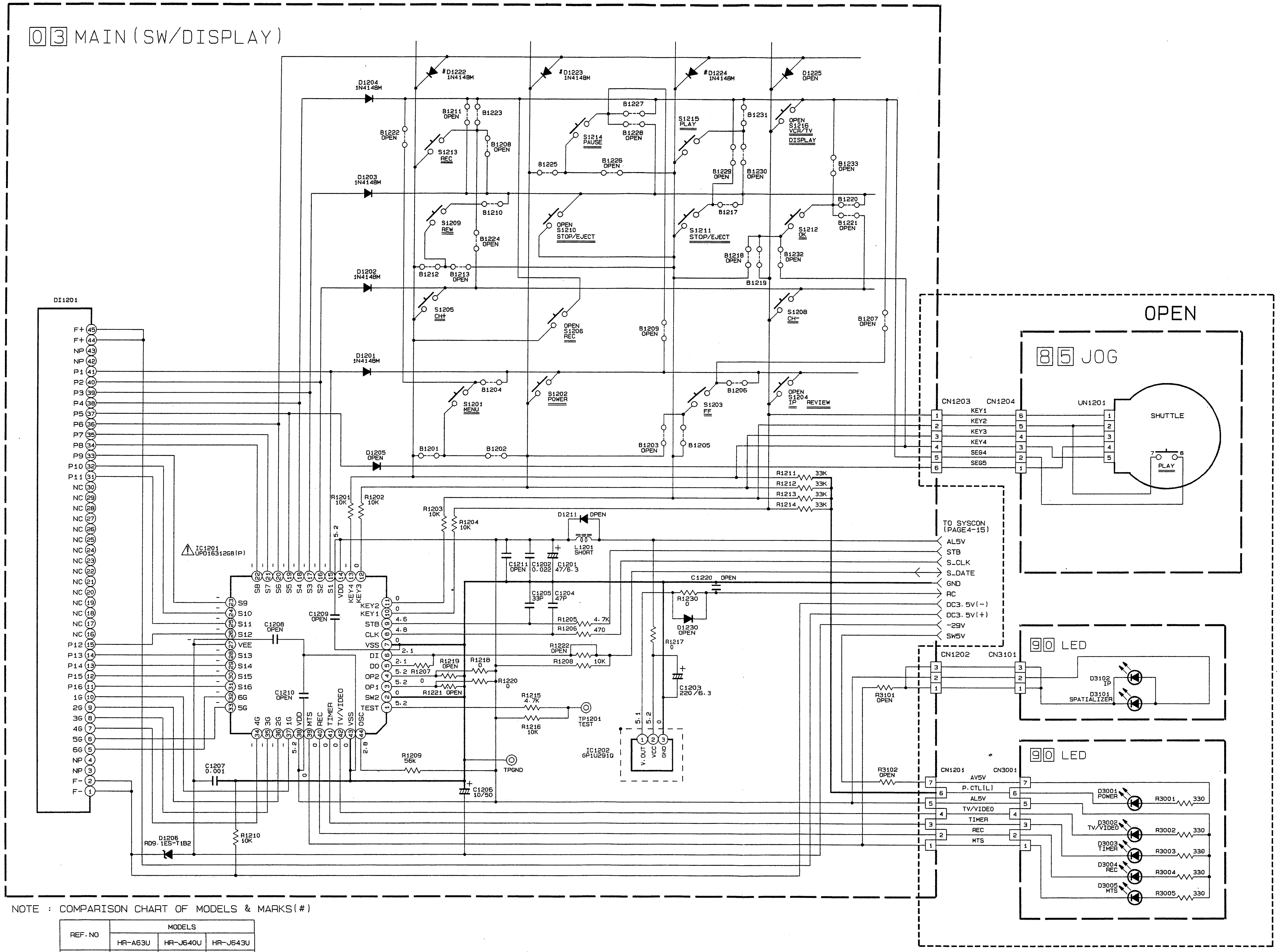
4.8 SWITCHING REGULATOR SCHEMATIC DIAGRAM


03 MAIN(SW. REG)
AC120V 60Hz
CN901
LIVE
NEUTRAL
F901 1.25A /250
VA901 OPEN
C901 0.047 /125
LF901 QQR0532-001
C902 OPEN
D901 S1WB(A)60F4102
C904 OPEN
CR901
C910 82 /200
R901 220K
R902 220K
R903 68K
C906 1 /50
R907 OPEN
R908 68K 2W
C917 0.0047 /1K
D910 AU01
D911 AU01
C907 100p /1kV
T901 QQS0011-001
C905 OPEN
K901 PELN0662
Q901 2SK2043 -CB14
D G S
3.6
0
R911 220K
C912 330p /50
R904 330 1/2W
C908 0.1 /50
MY
C915 0.01 /50
R906 680
R910 OPEN
C916 OPEN
D908 1N4148M
R909 1.5K
PC901 PS2501-1
D909 UZ15BSC
Q902 2SD2144S(UV)
0.3
R905 0.39 1/4W
C911 OPEN
C909 0.0047 /125
GROUND POINT FOR PRIMARY VOLTAGE
DANGEROUS VOLTAGE
D969 AU01Z
C951 220 /6.3
R970 24 1W
IC901 LA5613
VCC2 VO2 STB GND VO1-FIL VO1 VCC1 SENSE NF VOERR
6.0 5.1 5.0 0 12.3 11.6 12.3 12.3 1.3 11.0
C961 0.01 /50
D972 OPEN
D952 AU01Z
D953 AU01Z
D954 AU01Z
D956 AK04
D973 OPEN
C963 100 /6.3
C975 10 /50
C967 100 /16
D975 UZ6.8BSA
L953 33μ
L951 33μ
CP901 SHORT
CP
C953 680 /10
C954 820 /16
C971 220 /10
D955 UZ15BSA
C972 220 /16
R974 OPEN
R971 OPEN
R973 22K
C973 0.018 /50
C974 OPEN
L954 100μ
C955 OPEN
D951 OPEN
R951 470
D965 AU01Z
R955 2.2K 2W
C959 10 /63
GROUND POINT FOR SECONDARY VOLTAGE
D960 1N4148M
D958 RD30BSA
C960 10 /50
D968 AU01Z
R957 100 1/4W
FR
TO FMA (Page4-14)
AL6V
SW5V
SW12V
AL12V
GND
TO SYSCON (Page4-15)
DC(+)
DC(-)
SW5V
P.CTL(H)
SW12V
M12V
AL12V
GND
GND(M)
GND
AL5.8V
AL17V(OPEN)
48V
-29V
TO TUNER (Page4-19)
SW5V
SW12V
BT2
GND
TO VIDEO /N.AUDIO (Page4-11)
SW5V
SW12V
GND
AL6V

4.9 TUNER SCHEMATIC DIAGRAM


03 MAIN(TUNER)
TO VIDEO/ N.AUDIO (Page4-11)
RF_AUDIO
RF_VIDEO
TO SW.REG (Page4-18)
SW5V
BT2
SW12V
GND
TU1001 OPEN
ANT IN ANT OUT
AUDIO IN
CH.SW
MOD B(5V)
CONV.CTL(H)
VIDEO IN
AGC
MB(9V)
PB(5V)
TU(30V)
PLL CLK
PLL DATA
TU CE
LOCK(L)
IF
GND
IF
MB(9V)
AUDIO OUT
GND
AFT
AGC
VIDEO OUT
TU1002 OPEN
TU1001
TP(IF)NC
MB9V
AUDIO OUT (SIF)
NC
R1043 100
S1001 L(US4)/OPEN(US3)
C1040 OPEN
C1036 OPEN
C1039 OPEN
C1037 OPEN
C1010 OPEN
R1001 0
C1009 OPEN
R1002 1k
C1008 OPEN
R1003 0
R1004 470
D1001 HZ30-2L-T2
C1006 OPEN
C1005 OPEN
Q1001 2SC3243D-E
R1005 270
R1006 100
L1001 OPEN
D1002 HTZ10B
C1042 OPEN
C1038 OPEN
C1013 OPEN
C1014 10/50
R1014 OPEN
R1007 6.8K
C1015 0.056
R1008 3.9K
C1017 OPEN
R1017 OPEN
Q1003 OPEN
B1004 OPEN
B1003
R1012 OPEN
R1011 OPEN
Q1002 OPEN
R1042 OPEN
IC1501 μPC1854GT
MATRIX
off-set Absorption
VCA
Mode Selector
ST VCO SAP VCO Filter
Wide Band RMS
Timing Current
Spectral RMS
Wide Band filter
Spectral filter
fH trap
2.1K LPF
Y.E.
filter adjust
400LPF
IIL
ST/SAP SW
LPF
De Em
L+R LPF
PC
ST LPF
SAP BPF
ST VCO
Sub det
1/2
1/4
Phase det
Loop filter
SAP VCO
SAP det
SAP LPF
SAP VCO
Pilot DET
Phase DET
ATT
Noise BPF
Noise det
R1506 33k
R1507 33k
C1512 1/50
C1511 1/50
R1513 OPEN
R1512 OPEN
C1518 1/50
C1517 10/50
C1516 10/50
C1515 1/50
C1514 10/16
C1513 3.3/16
R1505 5.1k
R1504 3k
C1510 1/50
R1515 SHORT
R1514 SHORT
C1501 22/16
C1502 0.1
C1504 4.7/50
C1503 1/50
R1501 1k
C1505 2.2/50
C1506 0.1/50
R1502 330k
C1507 0.047
C1508 0.47/50
C1509 0.1
R1503 120k
R1508 3.9K
R1509 1.2K
C1519 OPEN
B1501 OPEN
Q1501 OPEN
B1502 OPEN
R1511 1.2K
C1520 OPEN
Q1502 OPEN
R1510 3.9K
TO SYSCON (Page4-16)
CONV_CTL(H)
M_CLK
M_DATA
TU_CE
LOCK(L)
AFT/BS_ANT
SYNC_DET(L)
TU_MUTE(H)
I2C_CLK
I2C_DATA
BIL_SEL
LED
JUST_CLK
TO AUDIO (Page4-11)
L
R
DEMOD(L)
GND
DEMOD(R)
R1030 470
R1031 180k
Q1005 2SC4081(RS)
C1041
C1030 0.1/50
C1031 470p
R1034 8.2K
R1033 1.2K
R1032 22K
R1044 4.7K
Q1008 2SB1218A(RS) 2SA1576(RS)
R1045 470
R1035 220
Q1006 2SA1576(RS)
C1033 470p
C1034 0.022
D1004 1SS133 1N4148M
Q1007 DTC114EU-X
LF1001
fH COIL
C1035 0.47/50
D1003 1SS133 1N4148M
OPEN
TO VIDEO (Page4-11)
GND
TU_VIDEO
V.DET
JPN/KR #CN1001
COMP/MPX
GND
MB9V/SW12V
DEMOD(L)
DEMOD(R)
TUMUTE(H)/N.C
BIL SEL
LED
JUST CLK/N.C
6
5
4
3
2
1
A
B
C
D
E
F
G
H

4.10 SW/DISPLAY SCHEMATIC DIAGRAM


03 MAIN (SW/DISPLAY)
DI1201
F+ 45
F+ 44
NP 43
NP 42
P1 41
P2 40
P3 39
P4 38
P5 37
P6 36
P7 35
P8 34
P9 33
P10 32
P11 31
NC 30
NC 16
P12 15
P13 14
P14 13
P15 12
P16 11
1G 10
2G 9
3G 8
4G 7
5G 6
6G 5
NP 4
NP 3
F- 2
F- 1
IC1201
UPD16312GB(P)
S9
S10
S11
S12
VEE
S13
S14
S15
S16
6G
5G
KEY2
KEY1
STB
CLK
VSS
DI
DO
OP2
OP1
SW2
TEST
4G
3G
2G
1G
VDD
MTS
REC
TIMER
TV/VIDEO
VSS
OSC
D1204 1N4148M
D1203 1N4148M
D1202 1N4148M
D1201 1N4148M
D1205 OPEN
#D1222 1N4148M
#D1223 1N4148M
#D1224 1N4148M
D1225 OPEN
S1213 REC
S1214 PAUSE
S1215 PLAY
OPEN S1216 VCR/TV DISPLAY
S1209 REW
OPEN S1210 STOP/EJECT
S1211 STOP/EJECT
S1212 OK
S1205 CH+
OPEN S1206 REC
S1208 CH-
S1201 MENU
S1202 POWER
S1203 FF
OPEN S1204 IP REVIEW
R1201 10K
R1202 10K
R1203 10K
R1204 10K
R1211 33K
R1212 33K
R1213 33K
R1214 33K
D1211 OPEN
L1201 SHORT
C1211 OPEN
C1202 0.022
C1201 47/6.3
C1205 33P
C1204 47P
C1220 OPEN
R1230 0
D1230 OPEN
R1217 0
C1203 220/6.3
R1205 4.7K
R1206 470
R1222 OPEN
R1208 10K
R1219 OPEN
R1218 0
R1207 0
R1221 OPEN
R1220 0
R1215 4.7K
R1216 10K
TP1201 TEST
IC1202 GP1U291Q
V.OUT
VCC
GND
R1209 56K
TPGND
C1206 10/50
C1207 0.001
C1208 OPEN
C1209 OPEN
C1210 OPEN
D1206 RD9.1ES-T1B2
R1210 10K
TO SYSCON (PAGE4-15)
AL5V
STB
S.CLK
S.DATE
GND
RC
DC3.5V(-)
DC3.5V(+)
-29V
SW5V
OPEN
85 JOG
CN1203
CN1204
UN1201
SHUTTLE
PLAY
KEY1
KEY2
KEY3
KEY4
SEG4
SEG5
90 LED
CN1202
CN3101
D3102 IP
D3101 SPATIALIZER
R3101 OPEN
R3102 OPEN
CN1201
CN3001
AV5V
P.CTL(L)
AL5V
TV/VIDEO
TIMER
REC
MTS
D3001 POWER
D3002 TV/VIDEO
D3003 TIMER
D3004 REC
D3005 MTS
R3001 330
R3002 330
R3003 330
R3004 330
R3005 330

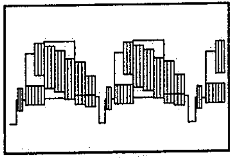
NOTE : COMPARISON CHART OF MODELS & MARKS(#)

REF. NO	MODELS		
	HR-A63U	HR-J640U	HR-J643U
D1222	OPEN	OPEN	USED
D1223	USED	OPEN	OPEN
D1224	OPEN	USED	OPEN

WAVEFORMS

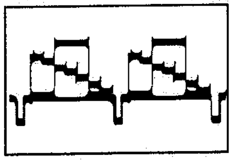
— VIDEO/N.AUDIO —

WF1 IC1-61



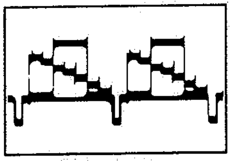
REC1.1Vp-p
50mV/20µsec/DIV

WF2 IC1-66



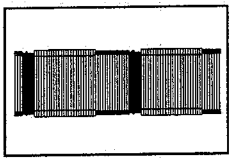
PB0.56Vp-p
20mV/20µsec/DIV

WF3 IC1-70



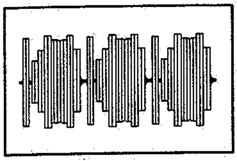
REC/PB0.56Vp-p
20mV/20µsec/DIV

WF4 IC1-6



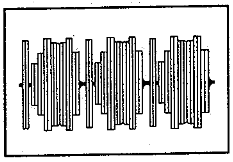
REC0.4Vp-p
20mV/5msec/DIV

WF5 IC1-13



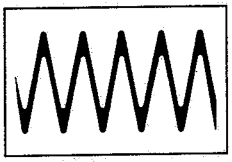
PB0.54Vp-p
20mV/20µsec/DIV

WF6 IC1-15



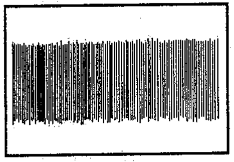
REC0.4Vp-p
20mV/20µsec/DIV

WF7 IC1-34



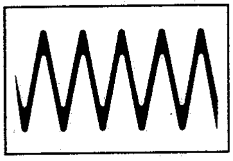
REC2.1Vp-p
50mV/1msec/DIV

WF8 IC1-38



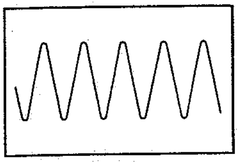
PB0.01Vp-p
0.5mV/5msec/DIV

WF9 IC1-43



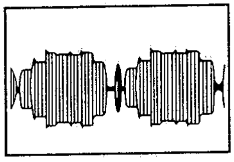
REC0.3Vp-p
10mV/1msec/DIV

WF10 IC1-46



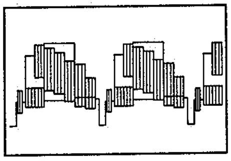
PB1.3Vp-p
50mV/1msec/DIV

WF11 IC1-55



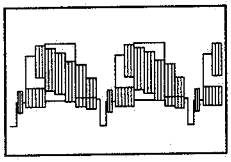
PB0.57Vp-p
20mV/20µsec/DIV

WF12 IC1-57



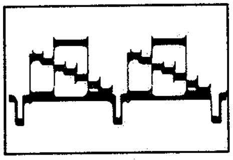
REC/PB2.2Vp-p
0.1V/20µsec/DIV

WF13 IC1301-13



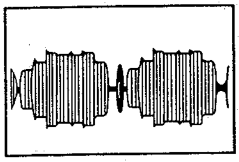
REC/PB2.2Vp-p
0.1V/20µsec/DIV

WF14 IC2-5



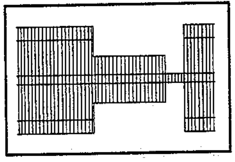
PB0.48Vp-p
20mV/20µsec/DIV

WF15 IC2-8



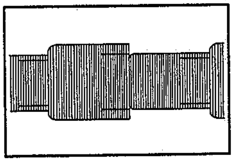
PB0.35Vp-p
20mV/20µsec/DIV

WF16-1 IC101-10



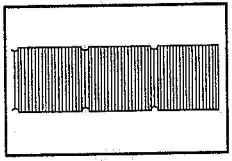
REC0.4Vp-p
20mV/5msec/DIV

WF16-2 IC101-10



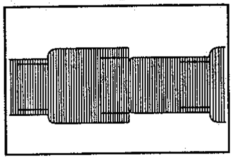
PB0.4Vp-p
20mV/5msec/DIV

WF17 IC101-17



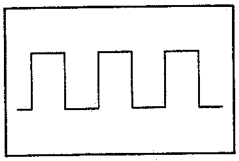
REC3.1Vp-p
0.1V/5msec/DIV

WF18 TP106
PB FM / COLOR



PB0.37Vp-pVp-p
20mV/5msec/DIV

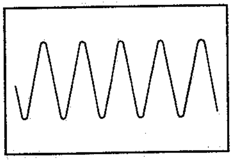
WF19 TP111
D.FF



REC/PB5.8Vp-p
0.2V/10msec/DIV

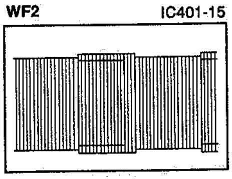
— FMA —

WF1 IC401-5



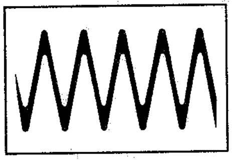
REC0.3Vp-p
10mV/1msec/DIV

WF2 IC401-15



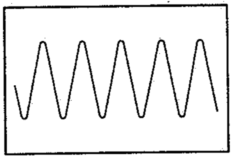
REC0.3Vp-p
10mV/1msec/DIV

WF3 IC401-38



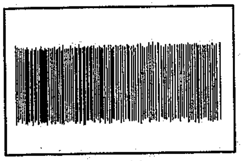
REC0.26Vp-p
10mV/1msec/DIV

WF4 IC401-46



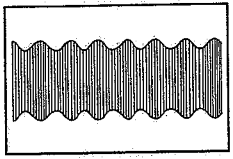
REC/PB1.6Vp-p
50mV/1msec/DIV

WF5 IC501-9



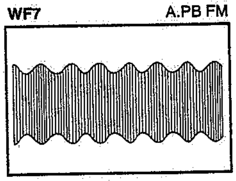
REC0.3Vp-p
20mV/1msec/DIV

WF6 IC501-16



REC1.7Vp-p
0.1V/1msec/DIV

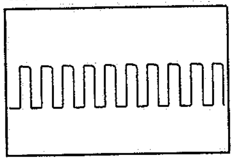
WF7 TP553
A.PB FM



PB0.5Vp-p
20mV/5msec/DIV

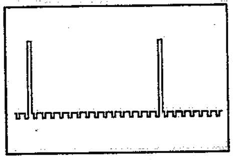
— SYSCON —

WF1 CN704-2
D.FG



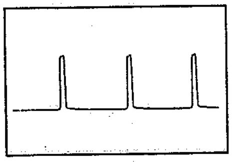
REC/PB4.7Vp-p
0.2V/1msec/DIV

WF2 CN704-4
D.PG



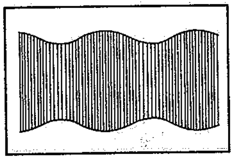
REC/PB4.8Vp-p
0.2V/5msec/DIV

WF3 IC701-93
C.SYNC



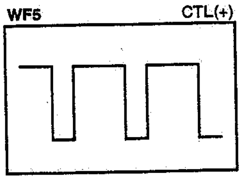
REC5.0Vp-p
0.2V/20µsec/DIV

WF4 CN701-1
CAP FG



REC/PB2.2Vp-p
0.1V/10msec/DIV

WF5 IC701-77
CTL(+)

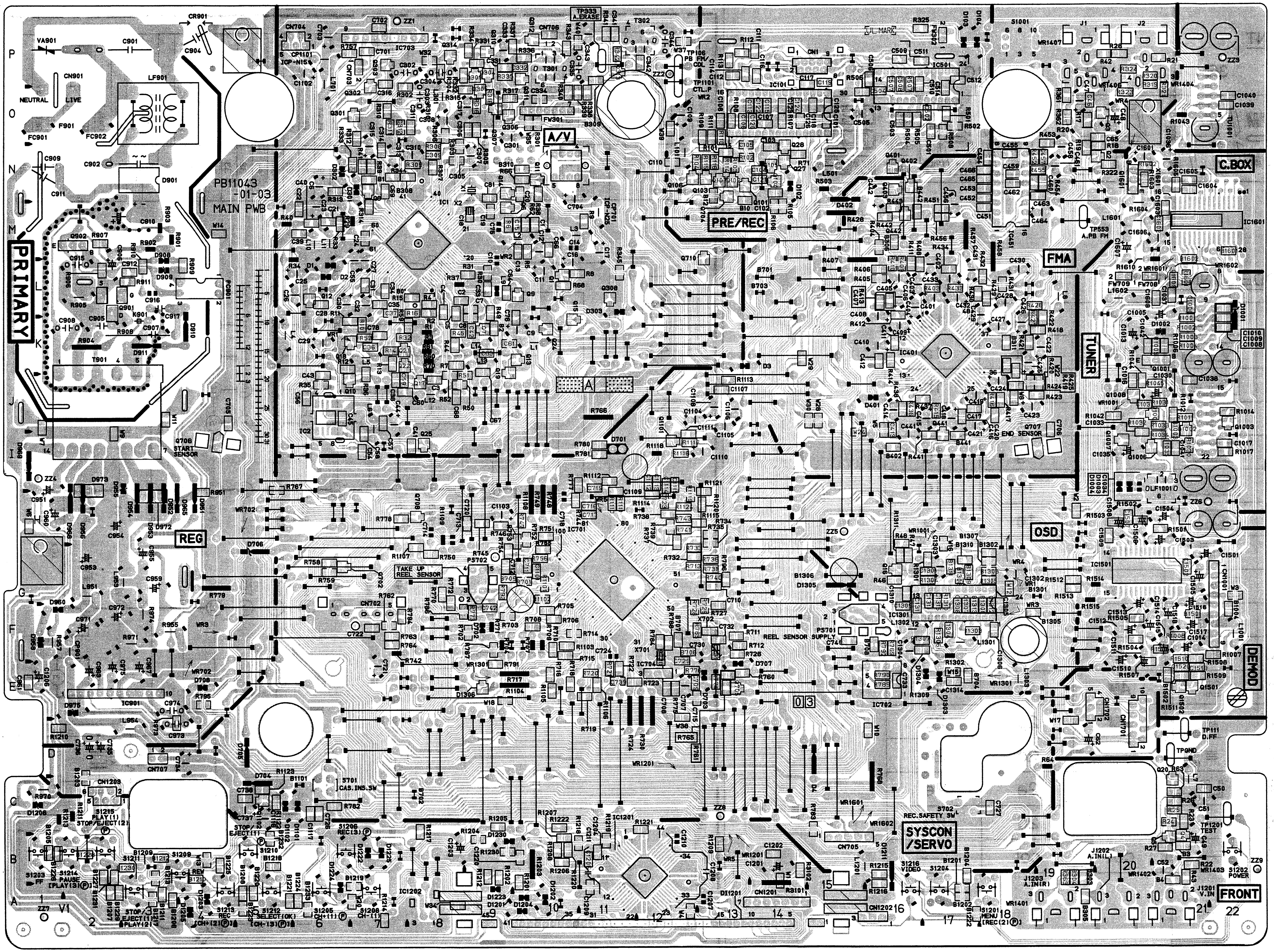


REC6.1Vp-p
0.2V/10msec/DIV

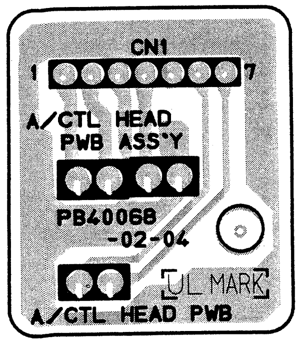
COMPONENT PARTS LOCATION GUIDE

REF.NO.	LOCATION		
CAPACITOR			
C1	B	C	10M
C2	B	C	8L
C3	B	C	8J
C4	B	C	8L
C5	B	C	8L
C6	A	D	6N
C7	B	C	9L
C8	B	C	9K
C9	A	D	9K
C10	A	D	9L
C11	A	D	10L
C12	A	D	10M
C13	B	C	9M
C14	A	D	11M
C15	B	C	9M
C16	A	D	10L
C17	A	D	11M
C18	B	C	9M
C19	B	C	9M
C20	B	C	10N
C21	B	C	6M
C22	B	C	6M
C23	A	D	6M
C24	B	C	7M
C25	A	D	6L
C26	A	D	6L
C27	A	D	7L
C28	B	C	6L
C29	A	D	6K
C30	A	D	6L
C31	B	C	7L
C32	A	D	7L
C33	B	C	9L
C34	B	C	7L
C35	B	C	7L
C36	B	C	7K
C37	B	C	7L
C38	B	C	7J
C39	B	C	6M
C40	B	C	6M
C41	B	C	8I
C42	B	C	9K
C43	B	C	6J
C44	A	D	7J
C45	B	C	6J
C46	B	C	19O
C47	A	D	19O
C48	A	D	20O
C49	A	D	21C
C50	B	C	21C
C51	A	D	21C
C52	A	D	21B
C54	B	C	7I
C55	A	D	7M
C56	B	C	6J
C57	B	C	7J
C58	B	C	7I
C59	B	C	7J
C60	B	C	7J
C61	B	C	9K
C62	A	D	19D
C63	B	C	9K
C64	B	C	9L
C65	B	C	20O
C66	B	C	10M
C67	B	C	9K
C68	B	C	8J
C69	B	C	7N
C75	A	D	9M
C76	B	C	9K
C78	B	C	7K
C81	B	C	9N
C101	B	C	15O
C102	B	C	14N
C103	B	C	14N
C104	B	C	14N
C105	B	C	13N
C106	B	C	13O
C107	B	C	14O
C108	B	C	13O
C109	A	D	12O
C110	B	C	12N
C111	B	C	14P
C112	B	C	13P
C113	B	C	14O
C114	B	C	13P
C115	B	C	14O
C116	B	C	14P
C117	B	C	15P
C118	B	C	15O
C119	B	C	15P
C120	B	C	14O
C121	B	C	14N
C122	B	C	14O
C123	B	C	14O
C124	B	C	14O
C125	B	C	15O
C126	B	C	14O
C301	A	D	9O
C302	A	D	8P
C303	A	D	8O
C304	A	D	8P
C305	B	C	8N
C306	B	C	9O
C307	A	D	9N
C308	A	D	8O
C309	B	C	8N
C310	A	D	8N
C311	B	C	8O
C312	B	C	7O
C313	A	D	7N
C314	B	C	7N
C315	A	D	7N
C316	B	C	7P
C317	A	D	9O
C331	B	C	9P
C332	B	C	10P
C333	A	D	9P
C334	B	C	10O
C335	A	D	11P
C341	B	C	11P
C342	B	C	12P
C343	A	D	11P
C344	A	D	12P
C401	A	D	17L
C402	A	D	17L
C403	A	D	16L
C404	A	D	16L
C405	A	D	16L
C406	A	D	16L
C407	B	C	16L
C408	A	D	16K
C409	A	D	16K
C410	A	D	16K
C411	B	C	16K
C412	B	C	16K
C413	B	C	16J
C414	A	D	16J
C415	A	D	17J
C416	B	C	17J
C417	B	C	17J
C418	A	D	17J
C419	A	D	18J
C420	B	C	18J
C421	A	D	18J
C422	A	D	19K
C423	A	D	18J
C424	A	D	18J
C425	A	D	18K
C426	A	D	18K
C427	A	D	18K
C428	A	D	18L
C429	A	D	18K
C430	A	D	18L
C431	A	D	17L
C432	A	D	17L
C433	A	D	17L
C441	A	D	16I
C442	A	D	16M
C451	B	C	18M
C452	B	C	18N
C453	B	C	18N
C454	B	C	18N
C455	B	C	18N
C456	A	D	17M
C457	B	C	19N
C458	A	D	19N
C459	B	C	18N
C460	B	C	19N
C461	A	D	19N
C462	B	C	18N
C463	B	C	19N
C464	A	D	19M
C465	B	C	18N
C466	B	C	18N
C501	B	C	17O
C502	B	C	17O
C503	B	C	16O
C504	B	C	16O
C505	A	D	15O
C506	B	C	16P
C507	B	C	16P
C508	B	C	16P
C509	B	C	16P
C510	B	C	16P
C511	B	C	17P
C512	B	C	17P
C514	B	C	17O
C701	B	C	7P
C702	B	C	7Q
C703	A	D	6P
C704	A	D	10N
C705	B	C	4J
C706	B	C	19J
C707	A	D	12E
C708	B	C	12E
C709	B	C	13E
C710	B	C	13G
C711	B	C	10G
C712	B	C	9G
C713	A	D	8G
C714	A	D	8H
C715	B	C	13E
C716	B	C	11H
C717	B	C	11H
C718	A	D	10H
C719	B	C	11I
C720	B	C	9H
C721	A	D	7E
C722	B	C	7F
C723	B	C	12H
C724	A	D	11F
C726	B	C	6C
C727	B	C	18C
C728	B	C	12F
C729	B	C	12E
C730	A	D	13F
C731	B	C	13F
C732	B	C	13F
C733	B	C	16E
C734	A	D	4D
C735	A	D	2D
C736	A	D	2D
C737	A	D	5C
C738	B	C	5C
C739	B	C	11E
C741	B	C	15F
C742	B	C	9F
C901	A	D	3P
C902	A	D	3N
C904	A	D	4Q
C905	A	D	2K
C906	A	D	2M
C907	A	D	3K
C908	A	D	2K
C909	A	D	1N
C910	A	D	2M
C911	A	D	1N
C912	B	C	3L
C915	A	D	2L
C916	A	D	3L
C917	A	D	3L
C951	A	D	1H
C953	A	D	2G
C954	A	D	3H
C955	A	D	3H
C959	A	D	3G
C960	A	D	1H
C961	B	C	1E
C963	A	D	2E
C967	A	D	3E
C971	A	D	2F
C972	A	D	3F
C973	A	D	4D
C974	A	D	4E
C975	A	D	2E
C1005	A	D	21L
C1006	B	C	21L
C1008	B	C	22K
C1009	B	C	22K
C1010	B	C	22L
C1013	A	D	20K
C1014	A	D	21F
C1016	B	C	20J
C1017	B	C	22I
C1030	A	D	20J
C1031	B	C	20J
C1033	B	C	20I
C1034	A	D	20I
C1035	A	D	20I
C1036	A	D	21N
C1037	B	C	21L
C1038	B	C	21J
C1039	B	C	22O
C1040	B	C	22O
C1041	B	C	21I
C1042	B	C	20K
C1101	B	C	10G
C1102	A	D	6P
C1103	A	D	9H
C1104	A	D	12J
C1105	A	D	13J
C1106	A	D	13J
C1107	B	C	13J
C1108	A	D	13J
C1109	B	C	11H
C1110	A	D	13I
C1111	B	C	12I
C1112	B	C	12I
C1113	B	C	12I
C1114	B	C	12I
C1115	B	C	12I
C1116	A	D	5C
C1117	B	C	6C
C1201	A	D	14B
C1202	B	C	14B
C1203	A	D	8B
C1204	B	C	11B
C1205	B	C	11B
C1206	A	D	1E
C1207	A	D	13A
C1208	A	D	12B
C1209	B	C	11B
C1210	A	D	12B
C1211	A	D	11A
C1220	B	C	9B
C1301	B	C	17G
C1302	A	D	18G
C1303	A	D	17G
C1304	A	D	16F
C1305	B	C	18F
C1306	B	C	18F
C1307	B	C	17F
C1308	B	C	17F
C1309	B	C	16F
C1310	B	C	16G
C1311	B	C	17G
C1312	B	C	18F
C1313	B	C	16F
C1314	B	C	17E
C1315	B	C	17G
C1501	A	D	21G
C1502	B	C	21G
C1503	A	D	20H
C1504	A	D	21H
C1505	A	D	21G
C1506	A	D	20H
C1507	B	C	20H
C1508	A	D	20H
C1509	B	C	20H
C1510	A	D	20E
C1511	A	D	20F
C1512	A	D	20F
C1513	A	D	20F
C1514	A	D	20F
C1515	A	D	21F
C1516	A	D	21G
C1517	A	D	21F
C1518	A	D	21F
C1519	B	C	21E
C1520	B	C	21E
C1601	A	D	20N
C1602	B	C	21M
C1603	B	C	21M
C1604	B	C	21N
C1605	B	C	21N
C1606	A	D	21M
C1607	A	D	20M
C1608	B	C	21L
C1609	B	C	21L
CONNECTOR			
CN1	A	D	15P
CN701	A	D	10N
CN702	A	D	7F
CN703	A	D	7P
CN704	A	D	6P
CN705	A	D	16B
CN706	A	D	10P
CN707	A	D	3D
CN709	A	D	19C
CN901	A	D	1O
CN1001	A	D	22G
CN1201	A	D	13A
CN1202	A	D	15A
CN1203	A	D	2C
CN1701	A	D	20D
CN1702	A	D	19E
CN3101	A	D	4C
CP			
CP701	A	D	11M
CP901	A	D	2F
CP1101	A	D	6P
DIODE			
D1	A	D	6L
D2	A	D	6L
D3	A	D	13K
D4	A	D	15C
D102	A	D	14N
D103	A	D	17P
D104	A	D	17P
D301	A	D	7N
D302	A	D	6N
D303	A	D	11L
D401	A	D	16J
D402	A	D	15N
D701	A	D	11I
D702	A	D	9F
D703	A	D	13E
D704	A	D	5C
D705	A	D	5D
D706	A	D	5G
D707	A	D	13E
D708	A	D	4E
D901	B	C	3N
D908	A	D	3L
D909	A	D	3L
D910	A	D	4K
D911	A	D	3K
D951	A	D	4I
D952	A	D	3I
D953	A	D	3I
D954	A	D	3I
D955	A	D	3I
D956	A	D	2I
D958	A	D	1F
D960	A	D	2F
D965	A	D	4I
D968	A	D	2H
D969	A	D	1I
D972	A	D	3H
D973	A	D	2H
D975	A	D	2E
D1001	A	D	22K
D1002	A	D	21K
D1003	A	D	20I
D1004	A	D	20H
D1101	A	D	6C
D1102	A	D	5C
D1201	A	D	10A
D1202	A	D	10A
D1203	A	D	4A
D1204	A	D	10A
D1205	A	D	4A
D1206	A	D	1C
D1211	A	D	16B
D1222	A	D	7B
D1223	A	D	9B
D1224	A	D	6B
D1225	A	D	7B
D1230	A	D	9B
D1303	A	D	17E
D1304	A	D	17E
D1305	A	D	15G
D1306	B	C	9E
D1401	A	D	19C
D1402	A	D	19C
D3101	A	D	4C
D3102	A	D	3C
IC			
IC1	B	C	8M
IC2	B	C	6J
IC101	A	D	15O
IC401	B	C	17K
IC451	A	D	18M
IC501	A	D	17O
IC701	B	C	11G
IC702	A	D	16E
IC703	A	D	8P
IC704	A	D	12E
IC901	A	D	2E
IC1201	B	C	12B
IC1202	A	D	8A
IC1301	A	D	18F
IC1501	B	C	20G
IC1601	B	C	21M
JACK			
J1	A	D	19Q
J2	A	D	20Q
J701	A	D	20C
J1201	A	D	21A
J1202	A	D	20A
J1203	A	D	19A
COIL			
L1	A	D	10K
L2	A	D	9M
L3	A	D	10M
L4	A	D	5K
L5	A	D	7K
L6	A	D	7I
L7	A	D	21D
L8	A	D	19L
L9	A	D	9L
L10	A	D	6M
L11	A	D	6M
L12	A	D	8J
L13	A	D	9K
L14	A	D	9K
L101	A	D	12O
L301	A	D	8O
L501	A	D	15N
L701	A	D	6P
L951	A	D	2G
L953	A	D	3G
L954	A	D	3D
L1001	A	D	22F
L1201	A	D	16B
L1301	A	D	17F
L1302	A	D	16F
L1303	A	D	18E
L1601	A	D	20M
L1602	A	D	20L
TRANSISTOR			
Q1	B	C	10L
Q2	B	C	20N
Q3	B	C	20O
Q4	B	C	21B
Q5	B	C	21B
Q6	B	C	9M
Q7	B	C	9K
Q8	B	C	7N
Q9	B	C	9L
Q10	B	C	7J
Q11	B	C	10N
Q12	B	C	6L
Q13	B	C	9K
Q14	B	C	9N
Q15	B	C	10K
Q16	B	C	16G
Q17	B	C	8J
Q18	B	C	7K
Q19	B	C	9K
Q20	B	C	21C
Q21	B	C	7K
Q22	B	C	7K
Q24	B	C	10K
Q25	B	C	8I
Q27	B	C	14N
Q28	B	C	14N
Q101	B	C	13N
Q102	B	C	13N
Q103	B	C	13N
Q104	B	C	14N
Q105	B	C	14N
Q106	B	C	13N
Q107	B	C	13N
Q301	B	C	7O
Q302	B	C	7P
Q303	B	C	7P
Q304	B	C	9P
Q305	B	C	9O
Q306	B	C	9O
Q307	B	C	9O
Q308	B	C	11L
Q309	B	C	9P
Q310	B	C	9P
Q311	B	C	10P
Q312	B	C	10P
Q313	B	C	11P
Q314	B	C	8P
Q401	B	C	16N
Q402	B	C	16N
Q403	B	C	16N
Q441	B	C	17I
Q442	B	C	16M
Q702	B	C	6G
Q704	B	C	13N
Q705	B	C	13E
Q706	A	D	4I
Q707	A	D	19I
Q708	B	C	8H
Q710	B	C	13M
Q901	A	D	2L
Q902	A	D	2M
Q1001	A	D	20K
Q1002	B	C	21J
Q1003	B	C	22J
Q1005	B	C	21J
Q1006	B	C	21I
Q1007	B	C	20I
Q1008	B	C	20J
Q1101	B	C	12I
Q1102	B	C	5C
Q1501	B	C	21E
Q1502	B	C	21E
Q1601	A	D	20N
RESISTOR			
R1	A	D	8K
R2	B	C	8L
R3	A	D	8K
R4	B	C	8L
R5	B	C	10M
R6	B	C	9M
R7	B	C	8K
R8	B	C	11L
R9	B	C	11M
R10	B	C	7K
R11	B	C	7K
R12	B	C	6K
R13	B	C	7K
R14	B	C	7K
R15	B	C	8L
R16	B	C	8L
R17	B	C	19O
R18	B	C	20N
R19	B	C	19N
R20	A	D	19O
R21	B	C	21P
R22	B	C	21B
R23	B	C	21C
R24	B	C	21C
R25	B	C	21C
R26	B	C	21C
R27	B	C	21B
R28	B	C	20P
R29	A	D	7M
R30	B	C	9L
R31	B	C	9L
R32	B	C	7K
R33	B	C	6M
R34	A	D	5L
R35	B	C	6J
R36	B	C	7J
R37	A	D	9L
R38	B	C	10N
R39	B	C	7N
R40	A	D	6M
R41	B	C	7N
R42	B	C	20P
R43	B	C	21B
R44	B	C	8K
R45	B	C	8K
R46	B	C	16G
R47	B	C	16G
R48	B	C	16H
R49	B	C	9L
R50	B	C	8J
R51	B	C	9J
R52	B	C	8J
R53	B	C	7K
R59	B	C	8K
R60	A	D	8K
R61	A	D	8K
R62	B	C	10M
R63	B	C	21C
R64	A	D	19D
R66	B	C	10N
R68	B	C	10L
R70	A	D	8K
R71	B	C	14N
R101	B	C	13N
R102	B	C	13N
R103	B	C	13N
R104	B	C	13N
R105	B	C	14M
R106	B	C	14M
R107	B	C	14O
R108	B	C	13O
R109	B	C	13O
R110	B	C	13O
R111	B	C	13O
R112	B	C	13P
R113	B	C	13P
R114	B	C	13N
R115	B	C	13N
R116	B	C	13N
R301	B	C	10O
R302	B	C	7O
R303	B	C	8N
R304	B	C	8P
R305	B	C	9O
R306	B	C	8O
R307	B	C	8N
R308	B	C	8N
R309	B	C	8N
R310	B	C	7O
R311	B	C	7O
R312	B	C	7O
R313	B	C	6N
R314	B	C	7M
R315	B	C	9O
R316	B	C	9O
R317	B	C	9O
R318	B	C	9O
R319	B	C	20P
R320	B	C	20P
R321	B	C	21O
R322	B	C	20N
R323	B	C	20O
R324	B	C	20P
R325	B	C	16P
R331	B	C	9P
R332	B	C	9P
R333	B	C	7N
R334	B	C	9P
R335	B	C	9P
R336	B	C	10P
R337	B	C	9P
R338	B	C	11O
R339	B	C	11O
R340	B	C	10O
R341	B	C	11P
R342	B	C	11P
R343	B	C	10P
R344	B	C	7N
R345	B	C	11L
R361	B	C	19O
R362	B	C	19O
R363	B	C	19B
R403	B	C	17L
R404	B	C	16M
R405	B	C	16L
R406	B	C	16L
R407	A	D	16L
R408	B	C	16L
R409	B	C	16L
R410	B	C	16L
R411	B	C	16L
R412	B	C	16L
R413	B	C	16L
R414	B	C	16K
R415	B	C	17J
R416	B	C	18J
R417	B	C	18J
R418	B	C	19K
R419	B	C	18J
R420	B	C	18K
R421	B	C	18K
R422	B	C	19K
R423	B	C	19J
R424	B	C	18J
R425	B	C	19J
R426	B	C	18L
R427	B	C	18K
R428	A	D	15M
R429	B	C	18L
R430	B	C	18L
R431	B	C	18L
R432	B	C	18L
R433	B	C	17L
R434	B	C	17L
R436	B	C	16J
R437	B	C	17J
R438	B	C	16J
R441	B	C	17I
R442	B	C	16M
R443	B	C	16M
R451	B	C	17M
R452	B	C	18N
R453	B	C	19N
R454	B	C	18N
R455	B	C	19N
R456	B	C	17M
R457	A	D	17M
R458	A	D	18L
R501	B	C	17O
R502	B	C	17O
R503	A	D	15N
R504	B	C	16O
R505	B	C	16O
R506	B	C	15O
R507	B	C	16P
R508	B	C	17O
R701	B	C	10G
R702	B	C	9F
R703	B	C	9F
R704	A	D	9F
R705	B	C	10F
R706	B	C	10F
R707	A	D	10F
R708	B	C	10F
R709	A	D	10F
R710	B	C	10F
R711	B	C	13F
R712	B	C	13F
R713	B	C	13G
R714	B	C	10F
R715	B	C	10F
R716	B	C	10E
R717	A	D	10E
R718	B	C	10E
R719	B	C	11E
R720	B	C	11E
R721	B	C	11E
R722	B	C	11E
R723	B	C	11E
R724	A	D	11D
R725	A	D	12D
R726	B	C	13F
R727	B	C	13F
R728	B	C	13F
R729	B	C	13F
R730	A	D	12D
R731	B	C	13G
R732	B	C	13G
R733	B	C	13G
R734	B	C	13H
R735	B	C	13H
R736	B	C	13G
R737	B	C	12H
R738	B	C	12H
R739	B	C	12H
R740	B	C	13G
R741	B	C	12H
R742	A	D	8F
R743	B	C	12H
R744	B	C	10H
R745	B	C	9H
R746	B	C	9H
R747	B	C	10H
R748	A	D	10H
R749	A	D	10H
R750	B	C	8G
R751	B	C	10H
R752	B	C	10H
R753	B	C	9H
R754	B	C	9G
R755	B	C	10G
R756	B	C	10G
R757	B	C	7P
R758	B	C	6G
R759	B	C	6G
R760	B	C	13E
R761	B	C	13E
R762	B	C	7F
R763	B	C	7F
R764	B	C	7F
R765	B	C	13E
R766	A	D	11J
R767	B	C	5H
R768	A	D	16C
R769	B	C	16F
R770	B	C	8G
R771	A	D	9F
R772	B	C	8G
R773	B	C	9F
R774	B	C	13E
R775	B	C	12E
R776	B	C	12E
R777	B	C	11I
R778	B	C	7H
R779	A	D	5G
R780	B	C	11I
R781	B	C	11I
R782	B	C	6C
R783	B	C	15C
R784	B	C	12F
R785	B	C	13F
R786	B	C	9F
R787	B	C	9F
R788	B	C	12F
R789	B	C	16E
R790	B	C	16E
R791	B	C	9E
R792	B	C	16F
R793	B	C	9G
R794	B	C	7F
R795	B	C	4E
R796	B	C	13G
R901	A	D	3M
R902	A	D	3M
R903	A	D	3M
R904	A	D	2K
R905	A	D	2L
R906	B	C	2L
R907	B	C	2M
R908	A	D	3K
R909	B	C	4L
R910	B	C	3L
R911	B	C	3L
R951	B	C	4H
R955	A	D	3F
R957	A	D	1F
R970	A	D	1C
R971	A	D	3F
R973	B	C	3D
R974	A	D	3F
R1001	B	C	21K
R1002	B	C	21K
R1003	B	C	21K
R1004	B	C	21K
R1005	B	C	21K
R1006	B	C	21K
R1007	B	C	22F
R1008	B	C	21F
R1011	B	C	21J
R1012	B	C	21J
R1014	B	C	22J
R1017	B	C	22I
R1030	B	C	21I
R1031	B	C	21J
R1032	B	C	20J
R1033	B	C	21J
R1034	B	C	21I
R1035	B	C	21I
R1042	B	C	20J
R1043	A	D	21O
R1044	B	C	20J
R1045	B	C	21J
R1101	B	C	10G
R1102	B	C	10G
R1103	B	C	10F
R1104	A	D	10E
R1105	B	C	10E
R1106	B	C	11E
R1107	B	C	8G
R1108	A	D	10H
R1109	A	D	8G
R1110	B	C	11H
R1111	B	C	11H
R1112	B	C	11I
R1113	B	C	13J
R1114	B	C	12H
R1115	B	C	13H
R1116	B	C	12I
R1117	B	C	12I
R1118	A	D	12I
R1119	B	C	12H
R1120	B	C	13H
R1121	B	C	13H
R1122	B	C	5C
R1123	B	C	5C
R1124	B	C	12H
R1201	B	C	9B
R1202	B	C	9B
R1203	A	D	10B
R1204	B	C	9B
R1205	B	C	9C
R1206	B	C	10B
R1207	B	C	10B
R1208	B	C	10B
R1209	B	C	13B
R1210	B	C	1D
R1211	A	D	2C
R1212	B	C	9B
R1213	A	D	1C
R1214	B	C	7A
R1215	B	C	16B
R1216	B	C	16B
R1217	B	C	8C
R1218	B	C	11B
R1219	B	C	11B
R1220	B	C	10B
R1221	B	C	12C
R1222	B	C	10C
R1230	B	C	9B
R1301	B	C	17G
R1302	A	D	17F
R1303	B	C	17F
R1304	B	C	17G
R1305	B	C	18G
R1306	B	C	17F
R1307	B	C	17F
R1308	B	C	18F
R1309	B	C	17F
R1310	B	C	17G
R1311	B	C	16G
R1501	B	C	21H
R1502	B	C	20H
R1503	B	C	20H
R1504	B	C	20F
R1505	B	C	20F
R1506	B	C	21F
R1507	B	C	20E
R1508	B	C	21F
R1509	B	C	21E
R1510	B	C	21F
R1511	B	C	21E
R1512	B	C	19G
R1513	B	C	19G
R1514	A	D	20G
R1515	A	D	20G
R1601	B	C	21L
R1602	B	C	20N
R1603	B	C	20N
R1604	A	D	20M
R1605	B	C	21N
R1610	A	D	21L
R3101	A	D	14B
R3102	B	C	14B
SWITCH			
S701	A	D	6C
S702	A	D	17C
S1001	A	D	18P
S1201	A	D	18B
S1202	A	D	22B
S1203	A	D	1B
S1204	A	D	17B
S1205	A	D	6B
S1206	A	D	6B
S1208	A	D	7B
S1209	A	D	4B
S1210	A	D	5B
S1211	A	D	3B
S1212	A	D	5B
S1213	A	D	4B
S1214	A	D	2B
S1215	A	D	2B
S1216	A	D	16B
TEST POINT			
TP106	A	D	12P
TP111	A	D	21D
TP333	A	D	11P
TP553	A	D	20M
TP1101	A	D	12P
TP1201	A	D	22C
TPGND	A	D	21D
OTHERS			
CR901	A	D	4Q
DI1201	A	D	15A
F901	A	D	2O
FW301	A	D	10O
FW302	A	D	17P
FW708	A	D	21L
FW709	A	D	20L
K901	A	D	3K
LF901	A	D	4O
LF1001	A	D	21I
PC901	A	D	4L
PS701	A	D	15F
PS702	A	D	9G
T301	A	D	10P
T302	A	D	12P
T901	A	D	1K
TU1001	A	D	22P
VA901	A	D	2P
WR1	A	D	6K
WR2	A	D	9M
WR3	A	D	4F
WR4	A	D	18G
WR5	A	D	13B
WR702	A	D	5H
WR1001	A	D	20J
WR1201	A	D	12D
WR1301	A	D	18E
WR1601	A	D	21L
WR1602	A	D	21L
X1	A	D	9N
X2	A	D	8M
X701	A	D	12F
X702	A	D	13F
X1601	A	D	21N

4.11 MAIN AND A/C HEAD CIRCUIT BOARDS

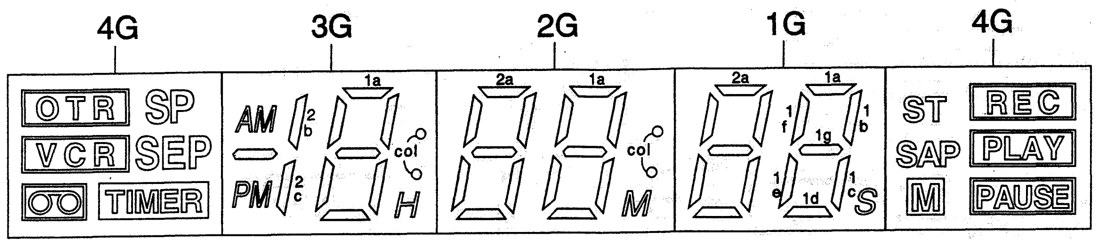

PRIMARY
REG
A/V
PRE/REC
FMA
TUNER
C.BOX
OSD
DEMOD
SYSCON
/SERVO
FRONT
PB11043
-01-03
MAIN PWB
NEUTRAL
LIVE
START SENSOR
END SENSOR
TAKE UP REEL SENSOR
REEL SENSOR SUPPLY
CAS.INS.SW
REC.SAFETY SW
UL MARK

— A/C HEAD —


CN1
1
7
A/CTL HEAD PWB ASS'Y
PB40068
-02-04
UL MARK
A/CTL HEAD PWB

4.12 FDP GRID ASSIGNMENT AND ANODE CONNECTION

GRID ASSIGNMENT

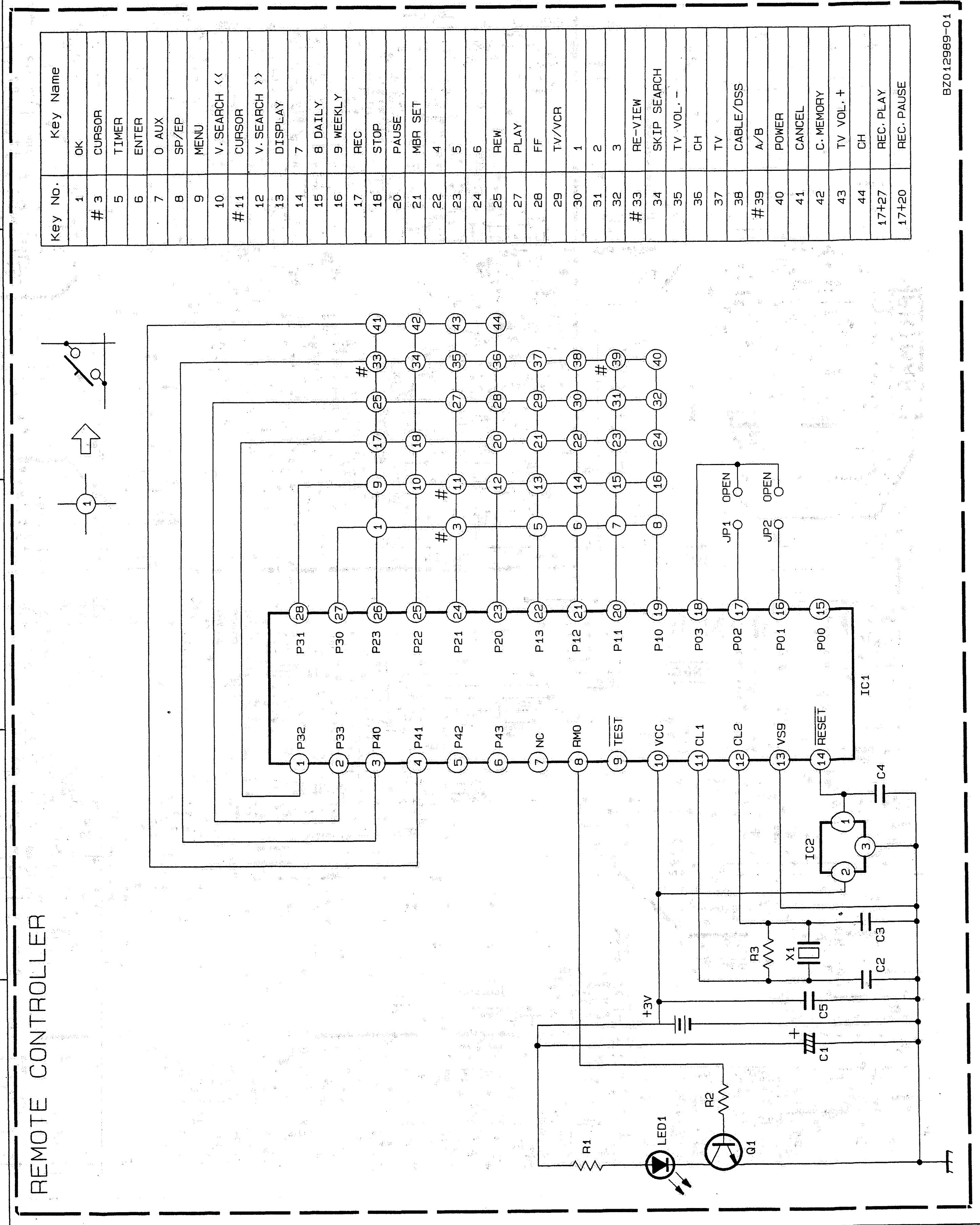

4G
3G
2G
1G
4G
OTR
SP
VCR
SEP
TIMER
AM
PM
1a
2a
1a
2a
1a
col
H
M
S
1g
1d
ST
SAP
M
REC
PLAY
PAUSE

ANODE CONNECTION

	4G	3G	2G	1G
P1	VCR	1a	1a	1a
P2	OTR	1b	1b	1b
P3	REC	1f	1f	1f
P4	PLAY	1g	1g	1g
P5	PAUSE	1c	1c	1c
P6	oo	1e	1e	1e
P7	M	1d	1d	1d
P8	TIMER	*H*	*M*	*S*
P9	SAP	2b, 2c	2a	2a
P10	ST	▭	2b	2b
P11	SP	*AM*	2f	2f
P12	S (SEP)	*PM*	2g	2g
P13	≡ (SEP)	—	2c	2c
P14	LP(SEP)	—	2e	2e
P15	—	—	2d	2d
P16	—	col	col	—

4.13 REMOTE CONTROL SCHEMATIC DIAGRAM

NOTES:
1. All parts shown in this schematic are critical for safety.
2. This schematic is only for reference.
Avoid replacing individual parts.
Replace the entire unit only.
3. Marks(#)use for HR-J643U/J640U.


BZ012989-01
REMOTE CONTROLLER
IC1
P31
P30
P23
P22
P21
P20
P13
P12
P11
P10
P03
P02
P01
P00
P32
P33
P40
P41
P42
P43
NC
RMO
TEST
VCC
CL1
CL2
VSS
RESET
IC2
JP1
JP2
OPEN
OPEN
C1
C2
C3
C4
C5
R1
R2
R3
X1
LED1
Q1
+3V
6
5
4
3
2
1
A
B
C
D

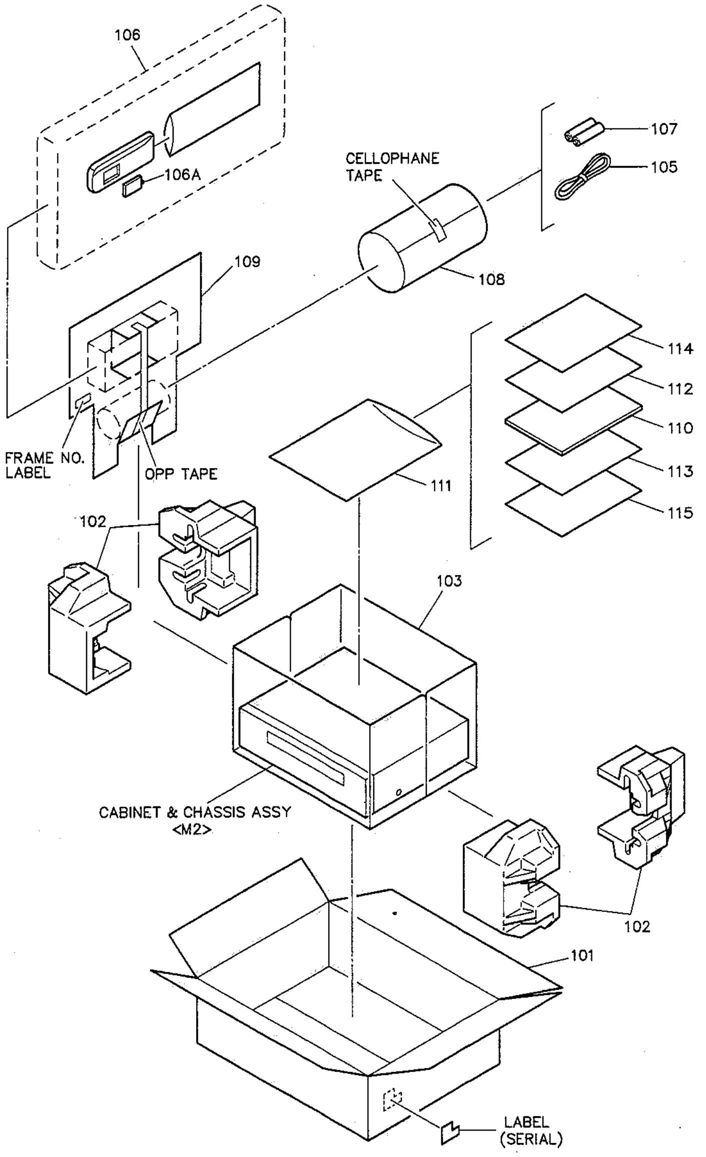
Key No.	Key Name
1	OK
# 3	CURSOR
5	TIMER
6	ENTER
7	0 AUX
8	SP/EP
9	MENU
10	V.SEARCH <<
# 11	CURSOR
12	V.SEARCH >>
13	DISPLAY
14	7
15	8 DAILY
16	9 WEEKLY
17	REC
18	STOP
20	PAUSE
21	MBR SET
22	4
23	5
24	6
25	REW
27	PLAY
28	FF
29	TV/VCR
30	1
31	2
32	3
# 33	RE-VIEW
34	SKIP SEARCH
35	TV VOL.-
36	CH
37	TV
38	CABLE/DSS
# 39	A/B
40	POWER
41	CANCEL
42	C.MEMORY
43	TV VOL.+
44	CH
17+27	REC.PLAY
17+20	REC.PAUSE

SECTION 5
PARTS LIST

SAFETY PRECAUTION

Parts identified by the ⚠ symbol are critical for safety. Replace only with specified part numbers.

5.1 PACKING AND ACCESSORY ASSEMBLY <M1>


106
106A
107
105
CELLOPHANE TAPE
108
109
114
112
110
113
115
FRAME NO. LABEL
OPP TAPE
111
102
103
CABINET & CHASSIS ASSY <M2>
102
101
LABEL (SERIAL)

****

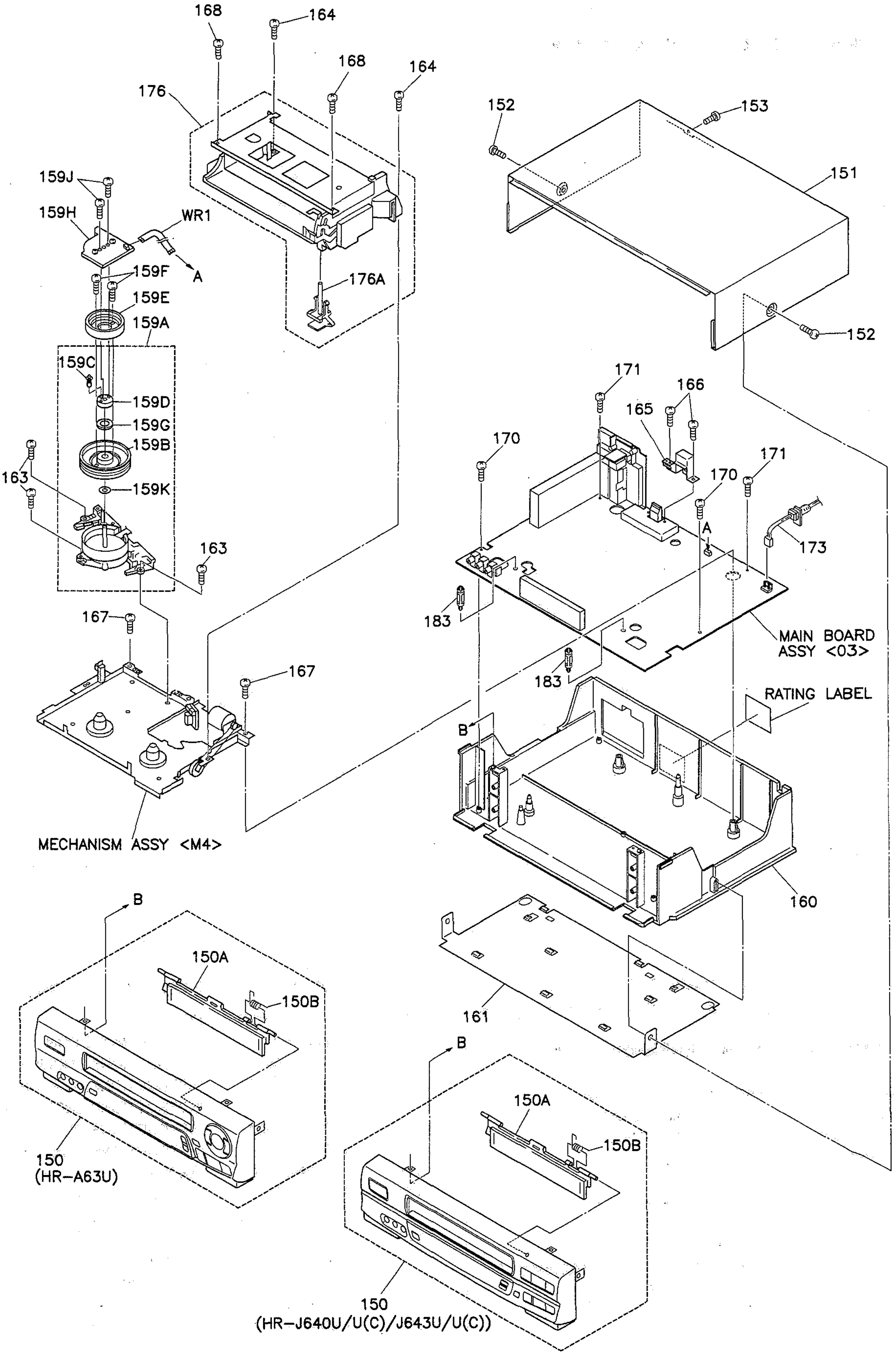
PACKING AND ACCESSORY ASSEMBLY <M1>

#⚠	REF No.	PART No.	PART NAME, DESCRIPTION
	101	LP30154-007A	PACKING CASE,J640U(C)
		LP30154-003A	PACKING CASE,J640U
		LP30154-005A	PACKING CASE,J643U(C)
		LP30154-015A	PACKING CASE,A63U
		LP30154-001A	PACKING CASE,J643U
	102	PQ35464A-5	CUSHION ASSEMBLY
	103	PQM30021-92	POLY BAG
⚠	105	PEAC0294-04	RF CABLE
⚠	106	LP20034-002A	REMOTE CONTROLLER,J640U/U(C) J643U/U(C)
⚠		LP20049-001B	REMOTE CONTROLLER,A63U
	106A	LP40033-001A	BATTERY CAP
	107	R6PRPA-2ST	BATTERY,X2
	108	QPC02202230P	POLY BAG
	109	PQ35575-1-1	SHEET,REMOTE CONTROLLER
⚠	110	LPT0002-001A	INSTRUCTIONS,ENGLISH J643U/U(C)
⚠		LPT0002-002A	INSTRUCTIONS,ENGLISH J640U/U(C)
⚠		LPT0002-004A	INSTRUCTIONS,ENGLISH A63U
⚠		LPT0002-005A	INSTRUCTIONS,FRENCH J643U(C)
⚠		LPT0002-009A	INSTRUCTIONS,FRENCH J640U(C)
	111	QPC02503530P	POLY BAG
	112	BT-20071B	SER.NET CARD,J640U(C) J643U(C)
		BT-51006-1	REGIST.CARD,J640U J643U,A63U
	113	PU36629-21	Q.START SHEET,J643U
		PU36629-23	Q.START SHEET,J640U
		PU36629-25	Q.START SHEET,A63U
	114	BT-52002-1	WARRANTY CARD,J640U(C) J643U(C)
	115	PU36560	CONECTION SHEET,J640U(C) J643U(

5.2 CABINET AND CHASSIS ASSEMBLY <M2>

BEWARE OF BOGUS PARTS

Parts that do not meet specifications may cause trouble in regard to safety and performance. We recommend that genuine JVC parts be used.



168
164
168
164
176
176A
152
153
151
152
159J
159H
WR1
A
159F
159E
159A
159C
159D
159G
159B
159K
163
163
163
167
167
MECHANISM ASSY <M4>
171
166
165
170
171
170
A
173
183
183
MAIN BOARD ASSY <03>
RATING LABEL
B
160
161
B
150A
150B
150
(HR-A63U)
B
150A
150B
150
(HR-J640U/U(C)/J643U/U(C))

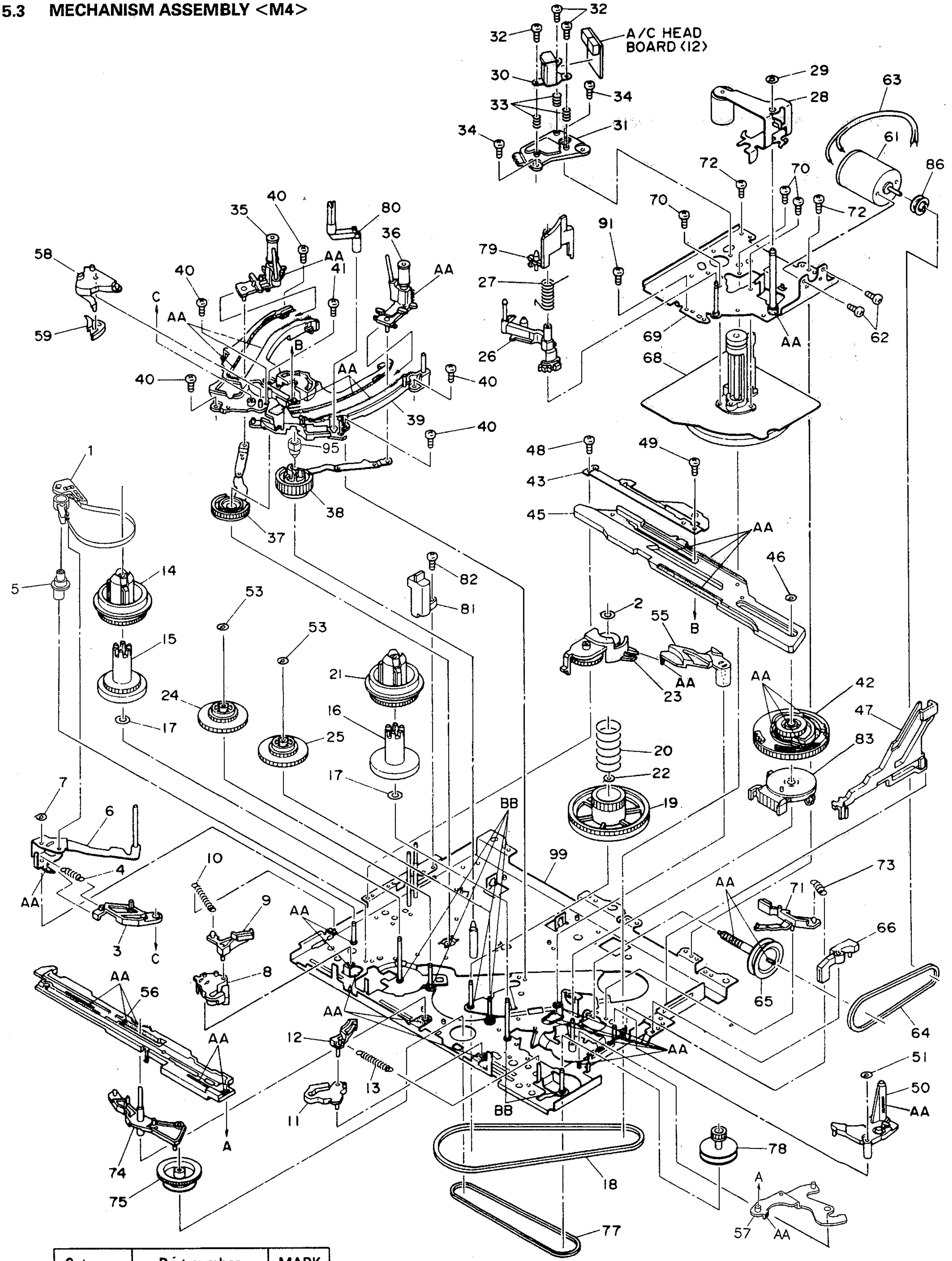
#⚠ REF No. PART No. PART NAME, DESCRIPTION

****

CABINET AND CHASSIS ASSEMBLY <M2>

	150	PQ11883V	FRONT PANEL ASSEMBLY,J643U/U(C)
		PQ11883W	FRONT PANEL ASSEMBLY,J640U/U(C)
		PQ11895P	FRONT PANEL ASSEMBLY,A63U
	150A	PQ21884-21	CASSETTE DOOR,J643U/U(C)
		PQ21884-26	CASSETTE DOOR,J640U/U(C)
		PQ21884-27	CASSETTE DOOR,A63U
	150B	PQ46448	TORSION SPRING
⚠	151	PQ11898-1-7	TOP COVER,J643U/U(C)
⚠		PQ11898-3-7	TOP COVER,A63U J640U/U(C)
	152	SDSF3010M	SCREW,X2 TOP COVER(SIDE)
	153	SDSF3010M	SCREW,TOP COVER(REAR)
	159A	LP20053-001A	DRUM SUB ASSEMBLY
	159B	LP20030-001A	UPPER DRUM ASSEMBLY
	159C	LP40025-001A	BRUSH ASSEMBLY
	159D	LP40028-001A	COLLAR ASSEMBLY
	159E	QAR0002-001	ROTOR ASSEMBLY
	159F	SPSP3006Z	SCREW,X2
	159G	PDM4439	CAP
	159H	QAR0003-001	STATOR ASSEMBLY
	159J	SPSP2606Z	SCREW,X2
	159K	PDM4444-19-2	WASHER
⚠	160	PQ21881-1-10	BOTTOM CHASSIS
⚠	161	PQ11899-1-4	BOTTOM COVER
	163	SPST2608Z	SCREW,X3 DRUM
	164	SPST2606Z	SCREW,X2 CASS HOUS ASSY
	165	PQ35385-1-1	SHIELD COVER,PRE/REC
	166	SDST2606Z	SCREW,X2 PRE/REC
	167	SDSF4012Z	SCREW,X2 MECH
	168	SDSF3010Z	SCREW,X2 CASS HOUS ASSY
	170	SDSF3010Z	SCREW,X2 MAIN
	171	DPSF3010Z	SCREW,X2 MAIN
⚠	173	QMP14K0-170	POWER CORD
	176	PUS29724E	CASSETTE HOUSING ASSY
	176A	PQ46359	CASSETTE SWITCH PIN
	183	PEME0947-01-01	SPACER,X2 MECH
	WR1	PW30803-0524	WIRE,DRUM MDA

5.3 MECHANISM ASSEMBLY <M4>



32
32
A/C HEAD BOARD (12)
30
29
33
34
28
63
34
31
61
72
70
86
40
35
80
70
72
36
91
58
AA
41
79
AA
40
27
C
AA
B
69
AA
62
59
26
68
40
AA
40
39
40
95
48
49
1
43
38
37
45
AA
14
46
5
53
82
81
2
55
15
53
B
21
AA
23
AA
42
24
47
17
16
25
20
83
17
22
7
BB
19
6
99
10
73
4
AA
71
9
AA
AA
66
3
C
AA
8
56
65
64
AA
12
AA
AA
13
51
11
BB
50
AA
A
78
74
18
A
75
77
57
AA

Category	Part number	MARK
Grease	KYODO-SH-P	AA
Oil	COSMO-HV56	BB

NOTE: The section marked in AA and BB indicate lubrication and greasing areas.

****

MECHANISM ASSEMBLY <M4>

#⚠	REF No.	PART No.	PART NAME, DESCRIPTION
	1	LP40006-001A	TENSION BAND ASSEMBLY
	2	PQM30017-34	SLIT WASHER
	3	PQ35012-1-5	TENSION ARM LEVER
	4	PQM30001-385109	TENSION SPRING
	5	LP30103-001A	ADJUST PIN
	6	PQ46303A-8	TENSION ARM ASSEMBLY
	7	PQM30017-47	SLIT WASHER
	8	PQ46305B-3	MAIN BRAKE ASSEMBLY (SUPPLY)
	9	PQ46306A-6	SUB BRAKE ASSEMBLY (SUPPLY)
	10	PQM30001-393	TENSION SPRING
	11	PQ46308A-5	MAIN BRAKE ASSEMBLY (TAKE UP)
	12	PQ46309A-4	SUB BRAKE ASSEMBLY (TAKE UP)
	13	PQM30001-389102	TENSION SPRING
	14	PQ46551B	REEL DISK ASSEMBLY (SUPPLY)
	15	PQ35436	SLIT DISK (SUPPLY)
	16	PQ35437	SLIT DISK (TAKE UP)
	17	PQM30018-79	SPACER,X2
	18	PQM30003-38	BELT (CAPSTAN)
	19	LP30105-001A	PULLEY
	20	LP40013-001C	COMPRESSION SPRING
	21	PQ46562B	REEL ASSEMBLY (TAKE UP)
	22	PQM30018-69	SPACER
	23	PQ46312C-13	IDLER ARM ASSEMBLY
	24	PQ46316A-4	CLUTCH UNIT (SUPPLY)
	25	PQ46323A-1	CLUTCH UNIT (TAKE UP)
	26	PQ46325C-9	GUIDE ARM ASSEMBLY
	27	PQ46326-2	TORSION SPRING
	28	PQ46327A-3	PINCH ROLLER ARM ASSEMBLY
	29	PQM30017-24	SLIT WASHER,P LEVER
	30	PEHE0182	AUDIO CONTROL HEAD
	31	PQ35206-1-3	HEAD BASE
	32	PQ43687A	SCREW,X3
	33	PQM30002-192	COMPRESSION SPRING,X3
	34	SDSP2604Z	SCREW,X2
	35	PQ46595B-5	POLE BASE ASSEMBLY (SUPPLY)
	36	PQ46331C	POLE BASE ASSEMNLY (TAKE UP)
	37	PQ46332B-3	LOADING ARM ASSEMBLY (SUPPLY)
	38	PQ46337C	LOADING ARM ASSEMBLY (TAKE UP
	39	PQ11657-1-9	GUIDE RAIL,
	40	SPST2608Z	SCREW,X5
	41	SDST2612Z	SCREW
	42	LP20003-001A	CONTROL CAM
	43	PQ35138-1-2	CONTROL BRACKET
	45	LP10004-001B	CONTROL PLATE
	46	PQM30017-8	SLIT WASHER
	47	PQ21685-2-9	PINCH PLATE
	48	SPST2606Z	SCREW
	49	SPSF2608M	SCREW
	50	PQ46342D-10	LEVER ASSEMBLY
	51	PQM30017-8	SLIT WASHER
	53	PQM30017-47	SLIT WASHER,X2
	55	PQ35026-1-7	IDLER LEVER
	56	PQ11659-1-12	SLIDE PLATE
	57	LP40014-001A	CHANGE LEVER ASSEMBLY
	58	PQ21686-1-3	TAKE UP LEVER
	59	PQ46345-1-2	TAKE UP HEAD
⚠	61	PU60628-3-2	LOADING MOTOR
	62	SPSP3003Z	SCREW,X2
	63	PW30101-80AJ632	WIRE
	64	LP30005-001A	BELT
	65	PQ46395B	WORM GEAR ASSEMBLY
	66	PQ21699-1-2	WORM BEARING
⚠	68	PU61487-2-3	CAPSTAN MOTOR
	69	PQ46347D	SUB DECK ASSEMBLY
	70	SPSG2608Z	SCREW,X3
	71	PQ46356C-3	CAPSTAN BRAKE ASSEMBLY
	72	SPST2606Z	SCREW,X2
	73	PQM30001-384101	TENSION SPRING,CAPSTAN BRAKE
	74	PQ46353A-2	CHANGE ARM ASSEMBLY
	75	PQ46354	CHANGE GEAR
	77	PQM30003-40	BELT
	78	LP40008-001A	CASSETTE GEAR
	79	PQ35030-1-5	LID GUIDE
	80	LP20032-001A	LED PRISM
	81	PEHE0237	FULL ERASE HEAD
	82	SDST2610Z	SCREW
	83	PU61432-1-1	ROTARY ENCODER
	86	PQ43546-1-2	MOTOR PULLEY
	91	SDSP2604Z	SCREW
	95	PQ46767-1-2	GUIDE CAP
	99	PQ21680L	MAIN DECK ASSEMBLY

5.4 ELECTRICAL PARTS LIST

****

MAIN BOARD ASSEMBLY <03>

#⚠	REF No.	PART No.	PART NAME, DESCRIPTION
	PW1	PB11043A1-02	MAIN BOARD ASSEMBLY,J643U/U(C)
		PB11043B1-01	MAIN BOARD ASSEMBLY,J640U/U(C)
		PB11043C1-01	MAIN BOARD ASSEMBLY,A63U
	IC1	HA118204F	IC
	IC2	MSM7476-76MS-XE	IC
	IC101	LA7416	IC
	IC401	AN3664FB-A	IC
	IC501	LA7257	IC
	IC701	M37774M9H229GP	VQP IC(MCU)
	IC702	X24C01AP	IC
	IC703	TA7291S	IC
	IC704	S-80728AN-Z	IC
	IC901	LA5613	IC
⚠	IC1201	UPD16312GB(P)	IC
⚠		or UPD16312GB(M)	IC
	IC1202	GP1U291Q	IR DETECT UNIT
		or PNA4652M00YC	IR DETECT UNIT
		or PIC-21143LJ	IR DETECT UNIT
	IC1301	LC74785-9644	IC (OSD)
	IC1501	UPC1854GT	IC
	Q1	2SD1819A(QRS)	TRANSISTOR
		or 2SC4081(QRS)	TRANSISTOR
		or 2PC4081/R/-X	TRANSISTOR
	Q2	2SB1218A(QR)	TRANSISTOR
		or 2PA1576/R/-X	TRANSISTOR
		or 2SA1576(QR)	TRANSISTOR
	Q10	UN521E	TRANSISTOR
		or RN1309	TRANSISTOR
		or DTC144WU	TRANSISTOR
	Q11	UN511E	TRANSISTOR,J643U/U(C)
		or RN2309	TRANSISTOR,J643U/U(C)
		or DTA144WU	TRANSISTOR,J643U/U(C)
	Q12	UN511E	TRANSISTOR,J643U/U(C)
		or DTA144WU	TRANSISTOR,J643U/U(C)
		or RN2309	TRANSISTOR,J643U/U(C)
	Q27	UN511E	TRANSISTOR
		or RN2309	TRANSISTOR
		or DTA144WU	TRANSISTOR
	Q28	UN511E	TRANSISTOR
		or DTA144WU	TRANSISTOR
		or RN2309	TRANSISTOR
	Q103	UN521E	TRANSISTOR
		or RN1309	TRANSISTOR
		or DTC144WU	TRANSISTOR
	Q104	UN521E	TRANSISTOR,J643U/U(C)
		or RN1309	TRANSISTOR,J643U/U(C)
		or DTC144WU	TRANSISTOR,J643U/U(C)
	Q105	UN511E	TRANSISTOR,J643U/U(C)
		or RN2309	TRANSISTOR,J643U/U(C)
		or DTA144WU	TRANSISTOR,J643U/U(C)
	Q106	UN521E	TRANSISTOR,J643U/U(C)
		or DTC144WU	TRANSISTOR,J643U/U(C)
		or RN1309	TRANSISTOR,J643U/U(C)
	Q304	UN511E	TRANSISTOR
		or RN2309	TRANSISTOR
		or DTA144WU	TRANSISTOR
	Q305	UN5111	TRANSISTOR
		or RN2302	TRANSISTOR
		or DTA114EU	TRANSISTOR
	Q306	2SD1819A(QRS)	TRANSISTOR
		or 2SC4081(QRS)	TRANSISTOR
		or 2PC4081/R/-X	TRANSISTOR
	Q307	2SD1819A(QRS)	TRANSISTOR
		or 2PC4081/R/-X	TRANSISTOR
		or 2SC4081(QRS)	TRANSISTOR
	Q308	DTC114EU	TRANSISTOR
		or RN1302	TRANSISTOR
		or UN5211	TRANSISTOR
	Q309	2SB1218A/QR/-X	TRANSISTOR
		or 2SA1576(QR)	TRANSISTOR
		or 2PA1576/R/-X	TRANSISTOR
	Q310	2SB1218A/QR/-X	TRANSISTOR
		or 2SA1576(QR)	TRANSISTOR
		or 2PA1576/R/-X	TRANSISTOR
	Q311	2SD1819A(QRS)	TRANSISTOR
		or 2PC4081/R/-X	TRANSISTOR
		or 2SC4081(QRS)	TRANSISTOR
	Q401	UN5215	TRANSISTOR
		or DTC114TU	TRANSISTOR
	Q402	UN511E	TRANSISTOR
		or RN2309	TRANSISTOR
		or DTA144WU	TRANSISTOR
	Q403	UN521E	TRANSISTOR
		or DTC144WU	TRANSISTOR
		or RN1309	TRANSISTOR
	Q702	2SD1819A(QRS)	TRANSISTOR
		or 2SC4081(QRS)	TRANSISTOR
		or 2PC4081/R/-X	TRANSISTOR
	Q706	LP40038-001A	TAPE SENSOR
	Q707	LP40038-001A	TAPE SENSOR
	Q708	2SD1819A(QRS)	TRANSISTOR
		or 2PC4081/R/-X	TRANSISTOR
		or 2SC4081(QRS)	TRANSISTOR
	Q710	UN5211	TRANSISTOR
		or RN1302	TRANSISTOR
		or DTC114EU	TRANSISTOR
	Q901	2SK2043-CB14	FE TRANSISTOR
		or 2SK1953-LF	FE TRANSISTOR
		or 2SK2324-LT	FE TRANSISTOR
		or 2SK2506-YF44	FE TRANSISTOR
	Q902	2SD2144S(UV)	TRANSISTOR
	Q1001	2SC3243D,E	TRANSISTOR
	Q1102	2SD1819A(QRS)	TRANSISTOR
		or 2PC4081/R/-X	TRANSISTOR
		or 2SC4081(QRS)	TRANSISTOR
	D1	1N4148M	DIODE
		or 1SS133	DIODE
	D2	1N4148M	DIODE
		or 1SS133	DIODE
	D102	1N4148M	DIODE
		or 1SS133	DIODE
	D301	1N4148M	DIODE
		or 1SS133	DIODE
	D303	RB721Q	DIODE,J643U/U(C)
	D402	11ES2	DIODE
	D701	SIR-381SB3FM	LE DIODE
		or SIR-381SB3FX1M	LE DIODE
	D702	1N4148M	DIODE
		or 1SS133	DIODE
	D704	11ES2	DIODE
	D705	11ES2	DIODE

#⚠	REF No.	PART No.	PART NAME, DESCRIPTION	
	D706	RD39ES-T1B3	DIODE	
		or MTZJ39(C)	ZENER DIODE	
		or UZ39BSC	DIODE	
	D908	1N4148M	DIODE	
		or 1SS133	DIODE	
	D909	UZ15BSC	ZENER DIODE	
		or RD15ES-T1B3	ZENER DIODE	
	D910	AU01	FR DIODE	
		or ERA18-04-T2	FR DIODE	
		or 1SR153-400-T2	FR DIODE	
		or 10ELS4	FR DIODE	
	D911	AU01	FR DIODE	
		or 1SR153-400-T2	FR DIODE	
		or ERA18-04-T2	FR DIODE	
		or 10ELS4	FR DIODE	
	D952	AU01Z	FR DIODE	
		or 1SR153-200-T2	FR DIODE	
		or 10ELS2	FR DIODE	
		or ERA18-02-T2	FR DIODE	
	D953	AU01Z	FR DIODE	
		or ERA18-02-T2	FR DIODE	
		or 1SR153-200-T2	FR DIODE	
		or 10ELS2	FR DIODE	
	D954	AU01Z	FR DIODE	
		or ERA18-02-T2	FR DIODE	
		or 1SR153-200-T2	FR DIODE	
		or 10ELS2	FR DIODE	
	D955	UZ15BSA	ZENER DIODE	
		or RD15ES-T1B1	ZENER DIODE	
		or MTZJ15(A)	ZENER DIODE	
	D956	AK04	DIODE	
		or 11EQS04	SB DIODE	
	D958	UZ30BSA	ZENER DIODE	
		or RD30ES-T1B1	ZENER DIODE	
		or MTZJ30(A)	ZENER DIODE	
	D960	1N4148M	DIODE	
		or 1SS133	DIODE	
	D965	AU01Z	FR DIODE	
		or ERA18-02-T2	FR DIODE	
		or 10ELS2	FR DIODE	
		or 1SR153-200-T2	FR DIODE	
	D968	AU01Z	FR DIODE	
		or 1SR153-200-T2	FR DIODE	
		or 10ELS2	FR DIODE	
		or ERA18-02-T2	FR DIODE	
	D969	AU01Z	FR DIODE	
		or ERA18-02-T2	FR DIODE	
		or 10ELS2	FR DIODE	
		or 1SR153-200-T2	FR DIODE	
	D975	UZ6.8BSA	ZENER DIODE	
		or RD6.8ES-T1B1	ZENER DIODE	
		or MTZJ6.8(A)	ZENER DIODE	
	D1001	HZ30-2L-T2	ZENER DIODE	
		or HZ30-2LTD	Z DIODE (M)	
	D1002	MTZ10B	ZENER DIODE	
	D1201	1N4148M	DIODE	
		or 1SS133	DIODE	
	D1202	1N4148M	DIODE	
		or 1SS133	DIODE	
	D1203	1N4148M	DIODE	
		or 1SS133	DIODE	
	D1204	1N4148M	DIODE	
		or 1SS133	DIODE	
	D1206	RD9.1ES-T1B2	ZENER DIODE	
		or UZ9.1BSB	ZENER DIODE	
		or MTZJ9.1(B)	ZENER DIODE	
	D1222	1N4148M	DIODE,J643U/U(C)	
		or 1SS133	DIODE,J643U/U(C)	
	D1223	1N4148M	DIODE,A63U	
		or 1SS133	DIODE,A63U	
	D1224	1N4148M	DIODE,J640U/U(C)	
		or 1SS133	DIODE,J640U/U(C)	
	D1305	11ES2	DIODE	
	R1	QRD161J-123	RESISTOR	12kΩ,1/6
	R2	QRSA08J-203YN	RESISTOR	20kΩ,1/10
	R3	QRD161J-393	RESISTOR	39kΩ,1/6
	R4	QRSA08J-103YN	RESISTOR	10kΩ,1/10
	R5	QRSA08J-561YN	RESISTOR	560Ω,1/10
	R6	QRSA08J-821YN	RESISTOR	820Ω,1/10
	R7	QRSA08J-0R0Y	RESISTOR	0Ω,1/10
	R8	QRSA08J-102YN	RESISTOR	1kΩ,1/10
	R9	QRSA08J-273YN	RESISTOR	27kΩ,1/10
	R10	QRSA08J-223YN	RESISTOR	22kΩ,1/10
	R11	QRSA08J-153YN	RESISTOR	15kΩ,1/10
	R12	QRSA08J-183YN	RESISTOR	18kΩ,1/10
	R13	QRSA08J-152YN	RESISTOR	1.5kΩ,1/10
	R14	QRSA08J-682YN	RESISTOR	6.8kΩ,1/10
	R15	QRSA08J-682YN	RESISTOR	6.8kΩ,1/10
	R16	QRSA08J-393YN	RESISTOR	39kΩ,1/10
	R20	QRD123J-331SX	RESISTOR	330Ω,1/2
	R21	QRSA08J-750YN	RESISTOR	75Ω,1/10
	R22	QRSA08J-750YN	RESISTOR	75Ω,1/10
	R29	QRD161J-225	RESISTOR	2.2MΩ,1/6
	R30	QRSA08J-0R0Y	RESISTOR	0Ω,1/10
	R31	QRSA08J-155YN	RESISTOR	1.5MΩ,1/10
	R33	QRSA08J-223YN	RESISTOR	22kΩ,1/10
	R34	QRD161J-183	RESISTOR	18kΩ,1/6
	R35	QRSA08J-0R0Y	RESISTOR	0Ω,1/10
	R36	QRSA08J-682YN	RESISTOR	6.8kΩ,1/10
	R40	QRD161J-271	RESISTOR	270Ω,1/6
	R43	QRSA08J-0R0Y	RESISTOR	0Ω,1/10
	R44	QRSA08J-102YN	RESISTOR	1kΩ,1/10
	R45	QRSA08J-0R0Y	RESISTOR	0Ω,1/10
	R50	QRSA08J-102YN	RESISTOR	1kΩ,1/10
	R66	QRSA08J-0R0Y	RESISTOR,J643U/U(C)	0Ω,1/10
	R68	QRSA08J-224YN	RESISTOR	220kΩ,1/10
	R71	QRSA08J-103YN	RESISTOR	10kΩ,1/10
	R101	QRSA08J-682YN	RESISTOR	6.8kΩ,1/10
	R102	QRSA08J-221YN	RESISTOR	220Ω,1/10
	R104	QRSA08J-823YN	RESISTOR,J643U/U(C)	82kΩ,1/10
	R105	QRSA08J-683YN	RESISTOR	68kΩ,1/10
	R106	QRSA08J-273YN	RESISTOR	27kΩ,1/10
	R107	QRSA08J-822YN	RESISTOR	8.2kΩ,1/10
	R110	QRSA08J-152YN	RESISTOR	1.5kΩ,1/10
	R111	QRSA08J-273YN	RESISTOR	27kΩ,1/10
	R115	QRSA08J-224YN	RESISTOR	220kΩ,1/10
	R301	QRSA08J-153YN	RESISTOR	15kΩ,1/10
	R302	QRSA08J-471YN	RESISTOR	470Ω,1/10
	R303	QRSA08J-121YN	RESISTOR	120Ω,1/10
	R305	QRSA08J-223YN	RESISTOR	22kΩ,1/10
	R306	QRSA08J-181YN	RESISTOR	180Ω,1/10
	R307	QRSA08J-682YN	RESISTOR	6.8kΩ,1/10
	R308	QRSA08J-224YN	RESISTOR	220kΩ,1/10

#⚠ REF No.	PART No.	PART NAME, DESCRIPTION	
R310	QRSA08J-0R0Y	RESISTOR	0Ω,1/10W
R312	QRSA08J-0R0Y	RESISTOR	0Ω,1/10W
R313	QRSA08J-103YN	RESISTOR	10kΩ,1/10W
R314	QRSA08J-103YN	RESISTOR	10kΩ,1/10W
R315	QRSA08J-103YN	RESISTOR	10kΩ,1/10W
R316	QRSA08J-153YN	RESISTOR	15kΩ,1/10W
R317	QRSA08J-472YN	RESISTOR	4.7kΩ,1/10W
R318	QRSA08J-472YN	RESISTOR	4.7kΩ,1/10W
R319	QRSA08J-103YN	RESISTOR	10kΩ,1/10W
R320	QRSA08J-221YN	RESISTOR	220Ω,1/10W
R322	QRSA08J-103YN	RESISTOR	10kΩ,1/10W
R323	QRSA08J-221YN	RESISTOR	220Ω,1/10W
R331	QRSA08J-183YN	RESISTOR	18kΩ,1/10W
R332	QRSA08J-473YN	RESISTOR	47kΩ,1/10W
R333	QRSA08J-183YN	RESISTOR	18kΩ,1/10W
R334	QRSA08J-473YN	RESISTOR	47kΩ,1/10W
R335	QRSA08J-3R3YN	RESISTOR	3.3Ω,1/10W
R336	QRSA08J-123YN	RESISTOR	12kΩ,1/10W
R337	QRSA08J-820YN	RESISTOR	82Ω,1/10W
R338	QRSA08J-472YN	RESISTOR	4.7kΩ,1/10W
R345	QRSA08J-103YN	RESISTOR	10kΩ,1/10W
R361	QRSA08J-101YN	RESISTOR	100Ω,1/10W
R362	QRSA08J-101YN	RESISTOR	100Ω,1/10W
R363	QRSA08J-101YN	RESISTOR	100Ω,1/10W
R403	QRSA08J-0R0Y	RESISTOR	0Ω,1/10W
R404	QRSA08J-0R0Y	RESISTOR	0Ω,1/10W
R405	QRSA08J-393YN	RESISTOR	39kΩ,1/10W
R409	QRSA08J-183YN	RESISTOR	18kΩ,1/10W
R412	QRSA08J-472YN	RESISTOR	4.7kΩ,1/10W
R413	QRSA08J-511YN	RESISTOR	510Ω,1/10W
R416	QRSA08J-472YN	RESISTOR	4.7kΩ,1/10W
R417	QRSA08J-511YN	RESISTOR	510Ω,1/10W
R420	QRSA08J-183YN	RESISTOR	18kΩ,1/10W
R424	QRSA08J-393YN	RESISTOR	39kΩ,1/10W
R425	QRSA08J-0R0Y	RESISTOR	0Ω,1/10W
R426	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
R427	QRSA08J-271YN	RESISTOR	270Ω,1/10W
R428	QRD161J-221	RESISTOR	220Ω,1/6W
R429	QRSA08J-0R0Y	RESISTOR	0Ω,1/10W
R431	QRSA08J-221YN	RESISTOR	220Ω,1/10W
R432	QRSA08J-221YN	RESISTOR	220Ω,1/10W
R501	QRSA08J-222YN	RESISTOR	2.2kΩ,1/10W
R503	QRD161J-223	RESISTOR	22kΩ,1/6W
R506	QRSA08J-152YN	RESISTOR	1.5kΩ,1/10W
R507	QRSA08J-681YN	RESISTOR	680Ω,1/10W
R508	QRSA08J-222YN	RESISTOR	2.2kΩ,1/10W
R703	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
R704	QRD161J-102	RESISTOR	1kΩ,1/6W
R705	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
R706	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
R708	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
R709	QRD161J-102	RESISTOR	1kΩ,1/6W
R710	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
R711	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
R712	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
R713	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
R715	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
R716	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
R717	QRD161J-102	RESISTOR,J643U/U(C)	1kΩ,1/6W
R718	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
R720	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
R721	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
R722	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
R723	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
R724	QRD161J-102	RESISTOR	1kΩ,1/6W
R725	QRD161J-102	RESISTOR	1kΩ,1/6W
R726	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
R727	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
R728	QRSA08J-392YN	RESISTOR	3.9kΩ,1/10W
R729	QRSA08J-392YN	RESISTOR	3.9kΩ,1/10W
R730	QRD161J-102	RESISTOR	1kΩ,1/6W
R731	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
R732	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
R733	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
R734	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
R735	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
R737	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
R739	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
R740	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
R741	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
R742	QRD161J-562	RESISTOR	5.6kΩ,1/6W
R744	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
R745	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
R747	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
R750	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
R751	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
R752	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
R753	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
R754	QRSA08J-471YN	RESISTOR	470Ω,1/10W
R755	QRSA08J-471YN	RESISTOR	470Ω,1/10W
R756	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
R757	QRSA08J-103YN	RESISTOR	10kΩ,1/10W
R758	QRSA08J-103YN	RESISTOR	10kΩ,1/10W
R759	QRSA08J-472YN	RESISTOR	4.7kΩ,1/10W
R761	QRSA08J-223YN	RESISTOR	22kΩ,1/10W
R762	QRSA08J-103YN	RESISTOR	10kΩ,1/10W
R763	QRSA08J-103YN	RESISTOR	10kΩ,1/10W
R764	QRSA08J-103YN	RESISTOR	10kΩ,1/10W
R765	QRSA08J-472YN	RESISTOR	4.7kΩ,1/10W
R766	QRD161J-750	RESISTOR	75Ω,1/6W
R767	QRSA08J-153YN	RESISTOR	15kΩ,1/10W
R768	QRD161J-153	RESISTOR	15kΩ,1/6W
R769	QRSA08J-181YN	RESISTOR	180Ω,1/10W
R770	QRSA08J-181YN	RESISTOR	180Ω,1/10W
R771	QRD161J-103	RESISTOR	10kΩ,1/6W
R772	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
R774	QRSA08J-103YN	RESISTOR	10kΩ,1/10W
R776	QRSA08J-472YN	RESISTOR	4.7kΩ,1/10W
R777	QRSA08J-104YN	RESISTOR	100kΩ,1/10W
R778	QRSA08J-472YN	RESISTOR	4.7kΩ,1/10W
R779	QRD161J-472	RESISTOR	4.7kΩ,1/6W
R782	QRSA08J-103YN	RESISTOR	10kΩ,1/10W
R783	QRSA08J-103YN	RESISTOR	10kΩ,1/10W
R784	QRSA08J-105YN	RESISTOR	1MΩ,1/10W
R785	QRSA08J-475YN	RESISTOR	4.7MΩ,1/10W
R787	QRSA08J-103YN	RESISTOR	10kΩ,1/10W
R788	QRSA08J-101YN	RESISTOR	100Ω,1/10W
R789	QRSA08J-153YN	RESISTOR	15kΩ,1/10W
R790	QRSA08J-153YN	RESISTOR	15kΩ,1/10W
R791	QRSA08J-104YN	RESISTOR	100kΩ,1/10W
R792	QRSA08J-273YN	RESISTOR	27kΩ,1/10W
R793	QRSA08J-273YN	RESISTOR	27kΩ,1/10W
R794	QRSA08J-392YN	RESISTOR	3.9kΩ,1/10W
R901	QRD161J-224	RESISTOR	220kΩ,1/6W

#⚠	REF No.	PART No.	PART NAME, DESCRIPTION	
	R902	QRD161J-224	RESISTOR	220kΩ,1/6W
	R903	QRD161J-683	RESISTOR	68kΩ,1/6W
	R904	QRD121J-331S	RESISTOR	330Ω,1/2W
	R905	QRX014J-R39Z	MF RESISTOR	0.39Ω,1W
	R906	QRSA08J-681YN	RESISTOR	680Ω,1/10W
	R908	QRG029J-683G	OMF RESISTOR	68kΩ,2W
	R909	QRSA08J-152YN	RESISTOR	1.5kΩ,1/10W
	R911	QRSA08J-224YN	RESISTOR	220kΩ,1/10W
	R951	QRSA08J-471YN	RESISTOR	470Ω,1/10W
	R955	QRG02DJ-222X	OMF RESISTOR	2.2kΩ,2W
⚠	R957	QRZ0077-101X	FUSIBLE RESISTOR	100Ω,1/4W
	R970	QRG01DJ-240X	OMF RESISTOR	24Ω,1W
	R973	QRSA08J-223YN	RESISTOR	22kΩ,1/10W
	R1001	QRSA08J-0R0Y	RESISTOR	0Ω,1/10W
	R1002	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
	R1003	QRSA08J-0R0Y	RESISTOR	0Ω,1/10W
	R1004	QRSA08J-471YN	RESISTOR	470Ω,1/10W
	R1005	QRSA08J-271YN	RESISTOR	270Ω,1/10W
	R1006	QRSA08J-101YN	RESISTOR	100Ω,1/10W
	R1007	QRSA08J-682YN	RESISTOR	6.8kΩ,1/10W
	R1008	QRSA08J-392YN	RESISTOR	3.9kΩ,1/10W
	R1043	QRD161J-101	RESISTOR	100Ω,1/6W
	R1101	QRSA08J-222YN	RESISTOR	2.2kΩ,1/10W
	R1102	QRSA08J-562YN	RESISTOR	5.6kΩ,1/10W
	R1104	QRD161J-102	RESISTOR	1kΩ,1/6W
	R1105	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
	R1106	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
	R1107	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
	R1108	QRD161J-102	RESISTOR	1kΩ,1/6W
	R1109	QRD161J-102	RESISTOR	1kΩ,1/6W
	R1110	QRSA08J-471YN	RESISTOR	470Ω,1/10W
	R1111	QRSA08J-471YN	RESISTOR	470Ω,1/10W
	R1112	QRSA08J-153YN	RESISTOR	15kΩ,1/10W
	R1113	QRSA08J-471YN	RESISTOR	470Ω,1/10W
	R1116	QRSA08J-104YN	RESISTOR	100kΩ,1/10W
	R1117	QRSA08J-104YN	RESISTOR	100kΩ,1/10W
	R1118	QRD161J-102	RESISTOR	1kΩ,1/6W
	R1119	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
	R1120	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
	R1121	QRSA08J-103YN	RESISTOR	10kΩ,1/10W
	R1122	QRSA08J-222YN	RESISTOR	2.2kΩ,1/10W
	R1123	QRSA08J-222YN	RESISTOR	2.2kΩ,1/10W
	R1201	QRSA08J-103YN	RESISTOR	10kΩ,1/10W
	R1202	QRSA08J-103YN	RESISTOR	10kΩ,1/10W
	R1203	QRD161J-103	RESISTOR	10kΩ,1/6W
	R1204	QRSA08J-103YN	RESISTOR	10kΩ,1/10W
	R1205	QRSA08J-472YN	RESISTOR	4.7kΩ,1/10W
	R1206	QRSA08J-471YN	RESISTOR	470Ω,1/10W
	R1207	QRSA08J-0R0Y	RESISTOR	0Ω,1/10W
	R1208	QRSA08J-103YN	RESISTOR	10kΩ,1/10W
	R1209	QRSA08J-563YN	RESISTOR	56kΩ,1/10W
	R1210	QRSA08J-103YN	RESISTOR	10kΩ,1/10W
	R1211	QRD161J-333	RESISTOR	33kΩ,1/6W
	R1212	QRSA08J-333YN	RESISTOR	33kΩ,1/10W
	R1213	QRD161J-333	RESISTOR	33kΩ,1/6W
	R1214	QRSA08J-333YN	RESISTOR	33kΩ,1/10W
	R1215	QRSA08J-472YN	RESISTOR	4.7kΩ,1/10W
	R1216	QRSA08J-103YN	RESISTOR	10kΩ,1/10W
	R1217	QRSA08J-0R0Y	RESISTOR	0Ω,1/10W
	R1218	QRSA08J-0R0Y	RESISTOR	0Ω,1/10W
	R1220	QRSA08J-0R0Y	RESISTOR	0Ω,1/10W
	R1230	QRSA08J-0R0Y	RESISTOR	0Ω,1/10W
	R1301	QRSA08J-222YN	RESISTOR	2.2kΩ,1/10W
	R1302	QRD161J-102	RESISTOR	1kΩ,1/6W
	R1303	QRSA08J-222YN	RESISTOR	2.2kΩ,1/10W
	R1305	QRSA08J-103YN	RESISTOR	10kΩ,1/10W
	R1306	QRSA08J-222YN	RESISTOR	2.2kΩ,1/10W
	R1307	QRSA08J-103YN	RESISTOR	10kΩ,1/10W
	R1310	QRSA08J-103YN	RESISTOR	10kΩ,1/10W
	R1501	QRSA08J-102YN	RESISTOR	1kΩ,1/10W
	R1502	QRSA08J-334YN	RESISTOR	330kΩ,1/10W
	R1503	QRSA08J-124YN	RESISTOR	120kΩ,1/10W
	R1504	QRSA08J-302YN	RESISTOR	3kΩ,1/10W
	R1505	QRSA08J-512YN	RESISTOR	5.1kΩ,1/10W
	R1506	QRSA08J-333YN	RESISTOR	33kΩ,1/10W
	R1507	QRSA08J-333YN	RESISTOR	33kΩ,1/10W
	R1508	QRSA08J-392YN	RESISTOR	3.9kΩ,1/10W
	R1509	QRSA08J-122YN	RESISTOR	1.2kΩ,1/10W
	R1510	QRSA08J-392YN	RESISTOR	3.9kΩ,1/10W
	R1511	QRSA08J-122YN	RESISTOR	1.2kΩ,1/10W
	C1	QCYA1HK-103	CAPACITOR	0.01μF,50V
	C3	QCYA1EK-104	CAPACITOR	0.1μF,25V
	C4	QCYA1HK-103	CAPACITOR	0.01μF,50V
	C5	QCYA1HK-103	CAPACITOR	0.01μF,50V
	C6	QEKJ1CM-106	E CAPACITOR	10μF,16V
	C7	QCYA1HK-103	CAPACITOR	0.01μF,50V
	C8	QCTA1CH-331	CAPACITOR	330pF,16V
	C9	QEKJ0JM-476	E CAPACITOR	47μF,6.3V
	C10	QCVB1CM-103	CAPACITOR	0.01μF,16V
	C11	QEKJ1HM-335	E CAPACITOR	3.3μF,50V
	C12	QEKJ1HM-225	E CAPACITOR	2.2μF,50V
	C13	QCYA1HK-472	CAPACITOR	0.0047μF,50V
	C14	QCBB1HJ-271	CAPACITOR	270pF,50V
	C15	QCTA1CH-820	CAPACITOR	82pF,16V
	C16	QEKJ1HM-225	E CAPACITOR	2.2μF,50V
	C17	QEKJ1HM-474	E CAPACITOR	0.47μF,50V
	C18	QCYA1EK-223	CAPACITOR	0.022μF,25V
	C19	QCYA1EK-683	CAPACITOR	0.068μF,25V
	C20	QCYA1EK-333	CAPACITOR	0.033μF,25V
	C21	QCYA1HK-103	CAPACITOR	0.01μF,50V
	C22	QCYA1EK-104	CAPACITOR	0.1μF,25V
	C23	QEKJ0JM-476	E CAPACITOR	47μF,6.3V
	C24	QCYA1CK-474	CAPACITOR	0.47μF,16V
	C25	QEKJ1EM-475	E CAPACITOR	4.7μF,25V
	C26	QEPF1CM-106	NP E CAPACITOR	10μF,16
	C28	QCYA1HK-103	CAPACITOR	0.01μF,50
	C29	QEKJ1CM-106	E CAPACITOR	10μF,16
	C30	QEKJ1HM-225	E CAPACITOR	2.2μF,50
	C31	QCYA1EK-104	CAPACITOR	0.1μF,25
	C32	QEKJ1HM-335	E CAPACITOR	3.3μF,50
	C33	QCYA1HK-103	CAPACITOR	0.01μF,50
	C34	QCYA1EK-104	CAPACITOR	0.1μF,25
	C35	QCYA1CK-224	CAPACITOR	0.22μF,16
	C36	QCTA1CH-330	CAPACITOR	33pF,16
	C37	QCYA1EK-104	CAPACITOR	0.1μF,25
	C38	QCTA1CH-151	CAPACITOR	150pF,16
	C39	QCTA1CH-150	CAPACITOR	15pF,16
	C41	QCYA1HK-103	CAPACITOR	0.01μF,50
	C43	QCYA1EK-104	CAPACITOR	0.1μF,25
	C44	QERF0JM-476	E CAPACITOR	47μF,6.3
	C45	QCYA1HK-103	CAPACITOR	0.01μF,50
	C46	QCYA1HK-103	CAPACITOR	0.01μF,50
	C47	QEKJ1CM-476	E CAPACITOR	47μF,16
	C48	QETC0JM-477	E CAPACITOR	470μF,6.3

#△	REF No.	PART No.	PART NAME, DESCRIPTION	
	C54	QCYA1HK-103	CAPACITOR	0.01µF,50V
	C55	QEKJ1CM-106	E CAPACITOR	10µF,16V
	C56	QCTA1CH-101	CAPACITOR	100pF,16V
	C60	QCTA1CH-120	CAPACITOR	12pF,16V
	C63	QCYA1HK-822	CAPACITOR	0.0082µF,50V
	C101	QCYA1HK-103	CAPACITOR	0.01µF,50V
	C103	QCYA1HK-103	CAPACITOR	0.01µF,50V
	C104	QCYA1EK-104	CAPACITOR,A63U J640U/U(C)	0.1µF,25V
		QCYA1HK-222	CAPACITOR,J643U/U(C)	0.0022µF,50V
	C105	QCYA1HK-103	CAPACITOR	0.01µF,50V
	C106	QCYA1HK-103	CAPACITOR	0.01µF,50V
	C107	QCYA1HK-103	CAPACITOR	0.01µF,50V
	C109	QEKJ1CM-476	E CAPACITOR	47µF,16V
	C113	QCYA1HK-103	CAPACITOR	0.01µF,50V
	C114	QCYA1EK-104	CAPACITOR	0.1µF,25V
	C115	QCYA1HK-103	CAPACITOR	0.01µF,50V
	C116	QCYA1EK-104	CAPACITOR	0.1µF,25V
	C117	QCYA1EK-104	CAPACITOR	0.1µF,25V
	C118	QCYA1HK-103	CAPACITOR	0.01µF,50V
	C119	QCYA1EK-104	CAPACITOR	0.1µF,25V
	C121	QCYA1EK-104	CAPACITOR,J643U/U(C)	0.1µF,25V
	C301	QEKJ1HM-105	E CAPACITOR	1µF,50V
	C302	QFN31HJ-123	F CAPACITOR	0.012µF,50V
	C303	QFV11HJ-473	F CAPACITOR	0.047µF,50V
	C306	QCYA1HK-182	CAPACITOR	0.0018µF,50V
	C307	QEKJ1EM-475	E CAPACITOR	4.7µF,25V
	C308	QEKJ1AM-226	E CAPACITOR	22µF,10V
	C309	QCYA1HK-153	CAPACITOR	0.015µF,50V
	C310	QEKJ1EM-475	E CAPACITOR	4.7µF,25V
	C312	QCYA1EK-683	CAPACITOR	0.068µF,25V
	C313	QEKJ1HM-105	E CAPACITOR	1µF,50V
	C314	QCYA1HK-152	CAPACITOR	0.0015µF,50V
	C315	QEKJ1EM-475	E CAPACITOR	4.7µF,25V
	C317	QEKJ1CM-476	E CAPACITOR	47µF,16V
	C331	QCYA1EK-223	CAPACITOR	0.022µF,25V
	C332	QCYA1HK-472	CAPACITOR	0.0047µF,50V
	C333	QEKJ1CM-106	E CAPACITOR	10µF,16V
	C334	QCYA1HK-331	CAPACITOR	330pF,50V
	C335	QFV11HJ-823	F CAPACITOR	0.082µF,50V
	C402	QEKJ1AM-226	E CAPACITOR	22µF,10V
	C403	QEKJ1CM-106	E CAPACITOR	10µF,16V
	C404	QEKJ1CM-106	E CAPACITOR	10µF,16V
	C407	QCYA1EK-473	CAPACITOR	0.047µF,25V
	C408	QEKJ1CM-336	E CAPACITOR	33µF,16V
	C409	QEKJ1HM-225	E CAPACITOR	2.2µF,50V
	C410	QEKJ1CM-476	E CAPACITOR	47µF,16V
	C411	QCYA1HK-153	CAPACITOR	0.015µF,50V
	C412	QCYA1HK-103	CAPACITOR	0.01µF,50V
	C413	QCYA1HK-103	CAPACITOR	0.01µF,50V
	C414	QEKJ1HM-224	E CAPACITOR	0.22µF,50V
	C416	QCYA1HK-103	CAPACITOR	0.01µF,50V
	C417	QCYA1HK-153	CAPACITOR	0.015µF,50V
	C418	QEKJ1CM-476	E CAPACITOR	47µF,16V
	C419	QEKJ1HM-225	E CAPACITOR	2.2µF,50V
	C420	QCYA1EK-473	CAPACITOR	0.047µF,25V
	C421	QEKJ1CM-336	E CAPACITOR	33µF,16V
	C424	QEKJ1CM-106	E CAPACITOR	10µF,16V
	C425	QEKJ1CM-106	E CAPACITOR	10µF,16V
	C426	QEKJ1HM-105	E CAPACITOR	1µF,50V
	C427	QEKJ1CM-476	E CAPACITOR	47µF,16V
	C428	QEKJ1CM-226	E CAPACITOR	22µF,16V
	C429	QEKJ1CM-106	E CAPACITOR	10µF,16V
	C430	QEKJ1CM-106	E CAPACITOR	10µF,16V
	C431	QEKJ1CM-106	E CAPACITOR	10µF,16V
	C501	QCYA1HK-103	CAPACITOR	0.01µF,50V
	C502	QCFA1EZ-104	CAPACITOR	0.1µF,25V
	C503	QCYA1HK-103	CAPACITOR	0.01µF,50V
	C504	QCFA1EZ-104	CAPACITOR	0.1µF,25V
	C505	QEKJ0JM-107	E CAPACITOR	100µF,6.3V
	C506	QCYA1EK-104	CAPACITOR	0.1µF,25V
	C507	QCYA1HK-563	CAPACITOR	0.056µF,50V
	C508	QCYA1HK-221	CAPACITOR	220pF,50V
	C509	QCYA1HK-102	CAPACITOR	0.001µF,50V
	C510	QCYA1HK-103	CAPACITOR	0.01µF,50V
	C511	QCYA1HK-102	CAPACITOR	0.001µF,50V
	C512	QCYA1HK-103	CAPACITOR	0.01µF,50V
	C701	QCYA1EK-104	CAPACITOR	0.1µF,25V
	C702	QCYA1HK-103	CAPACITOR	0.01µF,50V
	C703	QETF1HM-106	E CAPACITOR	10µF,50V
	C707	QEKJ1CM-106	E CAPACITOR	10µF,16V
	C709	QCYA1HK-103	CAPACITOR	0.01µF,50V
	C710	QCYA1EK-104	CAPACITOR	0.1µF,25V
	C711	QCTA1CH-100	CAPACITOR	10pF,16V
	C712	QCTA1CH-100	CAPACITOR	10pF,16V
	C713	QCBB1HJ-101	CAPACITOR	100pF,50V
	C714	QCBB1HJ-101	CAPACITOR	100pF,50V
	C715	QCYA1HK-103	CAPACITOR	0.01µF,50V
	C716	QCYA1HK-103	CAPACITOR	0.01µF,50V
	C717	QCYA1HK-103	CAPACITOR	0.01µF,50V
	C718	QCFB1HZ-473	CAPACITOR	0.047µF,50V
	C720	QCTA1CH-101	CAPACITOR	100pF,16V
	C721	QEKJ0JM-227	E CAPACITOR	220µF,6.3V
	C722	QCYA1HK-103	CAPACITOR	0.01µF,50V
	C724	QCVB1CN-103	CAPACITOR	0.01µF,16V
	C728	QCTA1CH-270	CAPACITOR	27pF,16V
	C729	QCTA1CH-270	CAPACITOR	27pF,16V
	C730	QAT3120-300Z	TRIM CAPACITOR,TIMER CLOCK	
	C732	QCTA1CH-330	CAPACITOR	33pF,16V
	C733	QCYA1HK-103	CAPACITOR	0.01µF,50V
	C734	QEKJ1CM-106	E CAPACITOR	10µF,16V
	C735	QETL0JM-338E	E CAPACITOR	3300µF,6.3V
	C737	QEKJ0JM-476	E CAPACITOR	47µF,6.3V
	C738	QCYA1HK-103	CAPACITOR	0.01µF,50V
	C739	QCTA1CH-101	CAPACITOR	100pF,16V
△	C901	QFZ9051-473	F CAPACITOR	0.047µF
	C906	QETC1HM-105	E CAPACITOR	1µF,50V
	C907	QCZ0136-101Z	CAPACITOR	100pF,1kV
	C908	QFV11HJ-104	F CAPACITOR	0.1µF,50V
△	C909	QCZ9073-472	CAPACITOR	0.0047µF
	C910	QETM2DM-826R	E CAPACITOR	82µF,200V
	C912	QCYA1HK-331	CAPACITOR	330pF,50V
	C915	QFN31HJ-103	F CAPACITOR	0.01µF,50V
	C917	QCZ0212-472	CAPACITOR	0.0047µF,1kV
	C951	QEMU0JM-227	E CAPACITOR	220µF,6.3V
	C953	QEMT1AM-687	E CAPACITOR	680µF,10V
	C954	QEMT1CM-827	E CAPACITOR	820µF,16V
	C959	QETC1JM-106	E CAPACITOR	10µF,63V
	C960	QETC1HM-106	E CAPACITOR	10µF,50V
	C961	QCFA1HZ-103	CAPACITOR	0.01µF,50V
	C963	QETC0JM-107	E CAPACITOR	100µF,6.3V
	C967	QETC1CM-107	E CAPACITOR	100µF,16V
	C971	QETC1AM-227	E CAPACITOR	220µF,10V
	C972	QETC1CM-227	E CAPACITOR	220µF,16V
	C973	QFLC1HJ-183Z	F CAPACITOR	0.018µF,50V

#⚠	REF No.	PART No.	PART NAME, DESCRIPTION	
	C975	QETC1HM-106	E CAPACITOR	10μF,50V
	C1014	QETC1HM-106	E CAPACITOR	10μF,50V
	C1016	QCYA1EK-563	F CAPACITOR	0.056μF,25V
	C1101	QCYA1EK-104	CAPACITOR	0.1μF,25V
	C1102	QEKJ1HM-105	E CAPACITOR	1μF,50V
	C1104	QEKJ0JM-226	E CAPACITOR	22μF,6.3V
	C1105	QEPF1HM-105	NP E CAPACITOR	1μF,50V
	C1106	QEPF1HM-105	NP E CAPACITOR	1μF,50V
	C1107	QCYA1HK-273	CAPACITOR	0.027μF,50V
	C1109	QCYA1HK-102	CAPACITOR	0.001μF,50V
	C1112	QCYA1EK-563	CAPACITOR	0.056μF,25V
	C1113	QCYA1HK-102	CAPACITOR	0.001μF,50V
	C1114	QCTA1CH-101	CAPACITOR	100pF,16V
	C1115	QCTA1CH-101	CAPACITOR	100pF,16V
	C1116	QEKJ0JM-476	E CAPACITOR	47μF,6.3V
	C1117	QCYA1HK-103	CAPACITOR	0.01μF,50V
	C1201	QETC0JM-476	E CAPACITOR	47μF,6.3V
	C1202	QCFA1HZ-223	CAPACITOR	0.022μF,50V
	C1203	QETC0JM-227	E CAPACITOR	220μF,6.3V
	C1204	QCTA1CH-470	CAPACITOR	47pF,16V
	C1205	QCTA1CH-330	CAPACITOR	33pF,16V
	C1206	QETC1HM-106	E CAPACITOR	10μF,50V
	C1207	QCBB1HJ-102	CAPACITOR	0.001μF,50V
	C1302	QEKJ1HM-105	E CAPACITOR	1μF,50V
	C1303	QEKJ1HM-105	E CAPACITOR	1μF,50V
	C1304	QERF0JM-476	E CAPACITOR	47μF,6.3V
	C1305	QCYA1HK-103	CAPACITOR	0.01μF,50V
	C1306	QCYA1HK-103	CAPACITOR	0.01μF,50V
	C1307	QCTA1CH-330	CAPACITOR	33pF,16V
	C1308	QCTA1CH-330	CAPACITOR	33pF,16V
	C1309	QCYA1HK-103	CAPACITOR	0.01μF,50V
	C1310	QCTA1CH-680	CAPACITOR	68pF,16V
	C1311	QCYA1HK-103	CAPACITOR	0.01μF,50V
	C1315	QCYA1HK-103	CAPACITOR	0.01μF,50V
	C1501	QETC1CM-226	E CAPACITOR	22μF,16V
	C1502	QCYA1EK-104	CAPACITOR	0.1μF,25V
	C1503	QETC1HM-105	E CAPACITOR	1μF,50V
	C1504	QETC1HM-475	E CAPACITOR	4.7μF,50V
	C1505	QETC1HM-225	E CAPACITOR	2.2μF,50V
	C1506	QETC1HM-104	E CAPACITOR	0.1μF,50V
	C1507	QCYA1EK-473	CAPACITOR	0.047μF,25V
	C1508	QETC1HM-474	E CAPACITOR	0.47μF,50V
	C1509	QCYA1EK-104	CAPACITOR	0.1μF,25V
	C1510	QETC1HM-105	E CAPACITOR	1μF,50V
	C1511	QETC1HM-105	E CAPACITOR	1μF,50V
	C1512	QETC1HM-105	E CAPACITOR	1μF,50V
	C1513	QEE81CJ-335	T CAPACITOR	3.3μF,16V
	C1514	QEE81CJ-106	T CAPACITOR	10μF,16V
	C1515	QETC1HM-105	E CAPACITOR	1μF,50V
	C1516	QETC1HM-106	E CAPACITOR	10μF,50V
	C1517	QETC1HM-106	E CAPACITOR	10μF,50V
	C1518	QETC1HM-105	E CAPACITOR	1μF,50V
	L1	QQL29BJ-2R2Z	COIL	2.2μH
	L2	QQL29BJ-150Z	COIL	15μH
	L3	QQL29BJ-6R8Z	COIL	6.8μH
	L4	QQL29BJ-101Z	COIL	100μH
	L5	QQL29BJ-101Z	COIL	100μH
	L6	QQL29BJ-2R2Z	COIL	2.2μH
	L10	QQL29BJ-680Z	COIL	68μH
	L12	QQL29BJ-150Z	COIL	15μH
	L14	QQL29BJ-471Z	COIL	470μH
	L101	QQL29BJ-101Z	COIL	100μH

#⚠	REF No.	PART No.	PART NAME, DESCRIPTION	
	L301	PU58308-123J	COIL	12mH
	L501	QQL29BJ-2R2Z	COIL	2.2μH
	L951	PELN1184	COIL	
	L953	PELN1184	COIL	
⚠	L954	PU48530-101K	COIL	100μH
	L1301	QQL29BJ-220Z	COIL	22μH
	L1302	QQL29BJ-101Z	COIL	100μH
	L1303	QQL29BJ-470Z	COIL	47μH
⚠	X2	PEVB0678	CRYSTAL RESONATOR	
⚠	X701	PEVB0567	CRYSTAL RESONATOR	
⚠	X702	YU40141	CRYSTAL RESONATOR	
	S701	PESW0674	PUSH SWITCH,CASSETTE SWITCH	
	S702	PESW0589	PUSH SWITCH,REC SAFETY	
	S1001	PESW0671	SLIDE SWITCH,RF CHAN SWITCH	
	S1201	PESW0525-02Z	TACT SWITCH,MENU	
	S1202	PESW0525-02Z	TACT SWITCH,POWER	
	S1203	PESW0525-02Z	TACT SWITCH,FF	
	S1205	PESW0525-02Z	TACT SWITCH,CH +	
	S1208	PESW0525-02Z	TACT SWITCH,CH-	
	S1209	PESW0525-02Z	TACT SWITCH,REW	
	S1211	PESW0525-02Z	TACT SWITCH,STOP/EJECT	
	S1212	PESW0525-02Z	TACT SWITCH,OK	
	S1213	PESW0525-02Z	TACT SWITCH,REC	
	S1214	PESW0525-02Z	TACT SWITCH,PAUSE	
	S1215	PESW0525-02Z	TACT SWITCH,PLAY	
	K901	PELN0662-Z	FERRITE BEADS	
⚠	PC901	PS2501-1	PH COUPLER	
	PS701	SG-246	IC(PHOTO SENSOR	
	PS702	SG-246	IC(PHOTO SENSOR	
⚠	T301	PELN0832	OSC TRANSFORMER	
⚠	T901	QQS0011-001	SW TRANSF	
	HD1	PQ35479-1-4	HOLDER(FDP)	
	J2	QNN0010-001	PIN JACK,A/V OUT	
⚠	TB1	PQ21910-3	TERMINAL BOARD	
	W4	QRSA08J-0R0Y	RESISTOR	0Ω,1/10
	W5	QRSA08J-0R0Y	RESISTOR	0Ω,1/10
	W10	QRSA08J-0R0Y	RESISTOR	0Ω,1/10
	W12	QRSA08J-0R0Y	RESISTOR	0Ω,1/10
	W13	QRSA08J-0R0Y	RESISTOR	0Ω,1/10
	W15	QRSA08J-0R0Y	RESISTOR	0Ω,1/10
	W16	QRSA08J-0R0Y	RESISTOR	0Ω,1/10
	W18	QRSA08J-0R0Y	RESISTOR	0Ω,1/10
	W20	QRSA08J-0R0Y	RESISTOR	0Ω,1/10
	W24	QRSA08J-0R0Y	RESISTOR	0Ω,1/10
	W28	QRSA08J-0R0Y	RESISTOR	0Ω,1/10
	W29	QRSA08J-0R0Y	RESISTOR	0Ω,1/10
	W30	QRSA08J-0R0Y	RESISTOR	0Ω,1/10
	W32	QRSA08J-0R0Y	RESISTOR	0Ω,1/10
	W34	QRSA08J-0R0Y	RESISTOR	0Ω,1/10
	W35	QRSA08J-0R0Y	RESISTOR	0Ω,1/10
	W37	QRSA08J-0R0Y	RESISTOR	0Ω,1/10
	W40	QRSA08J-0R0Y	RESISTOR	0Ω,1/10
⚠	FC901	PEMC0965-Z	FUSE CLIP,F901	
⚠	FC902	PEMC0965-Z	FUSE CLIP	
	FW301	PW30101-C0AH4W7	WIRE,(1-7)AC HEAD	
	FW302	PW30101-D0AH4W2	PARALLEL WIRE,(1-2)FE HEAD	
⚠	LF901	QQR0532-001	LINE FILTER	
	J1201	PEMC1162	PIN JACK,VIDEO IN J640U/U(C) J643U/U(C)	
		PU60613-5	PIN JACK, VIDEO IN A63U	
	J1202	PEMC1158	PIN JACK(SW),AUDIO L IN J640U/U(C) J643U/U(C)	
		PEMC1159	PIN JACK(SW),AUDIO L IN A63U	
	J1203	PEMC1158	PIN JACK(SW),AUDIO R IN J640U/U(C) J643U/U(C	

#⚠	REF No.	PART No.	PART NAME, DESCRIPTION	
		PEMC1159	PIN JACK(SW),AUDIO R IN A63U	
	SD1	PQ35384	SHIELD CASE,PRE/REC	
	SD2	PQ46515	SHIELD PLATE,PRE/REC	
⚠	CR901	PECA0962	CAPRISTOR	
	DI1201	QLF0004-001	FL TUBE	
⚠	TU1001	QAU0010-001	TUNER	
	CN1	PEMC1163-009	CONNECTOR,(1-9)UPPER DRUM	
	CN701	PEMC1077	CONNECTOR,(1-8)CAP MDA	
	CN702	PU61434-1-1	CONNECTOR,(1-5)ROTARY ENCODER	
	CN703	PU60910-2	CONNECTOR,(1-2)LOADING MOTOR	
	CN704	PEMC1101-005	CONNECTOR,(1-5)DRUM MOTOR	
	CN707	PEMC1119-002	PIN HEADER	
		PEMC1120	SHORT PIN	
⚠	CN901	PU60250-2	CONNECTOR,(1-2)AC IN	
⚠	CP701	ICP-N25	CIRCUIT PROTECTOR	
⚠	CP1101	ICP-N15	CIRCUIT PROTECTOR	
⚠	F901	QMF51N2-1R25J1	FUSE,1.25A	T1.2A

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AUDIO/CONTROL HEAD BOARD ASSY <12>

PW1	PB10916A-04	A/CTL HEAD BOARD ASSEMBLY
CN1	PU60910-107	CONNECTOR

SECTION 6
TECHNICAL INFORMATION

6.1 SYSCON CIRCUIT

6.1.1 Syscon CPU pin function (IC701) 1/2

PIN NO.	LABEL	IN/OUT	NOTE
1	PAL EP CTL	-	NC
2	PAL DET	-	NC
3	CAP CTL V	OUT	CAPSTAN MOTOR VOLTAGE DETECT
4	DRUM CTL V	OUT	DRUM MOTOR VOLTAGE DETECT
5	TU FG	IN	TAKE-UP REEL ROTATION DET/TAPE REMAIN
6	SP FG	IN	SUPPLY REEL ROTATION DET/TAPE REMAIN
7	AV CTL4	OUT	EDS CHIP ENABLE
8	AV CTL5	OUT	APERTURE CONTROL ON: L
9	AV CTL1	-	NC
10	A/M/S	OUT	PRE/REC IC CONTROL (AUTO: M/MANUAL: H/S&S: L)
11	RC IN	IN	REMOTE CONTROL DATA INPUT
12	PROTECT	IN	SWD 5V/12V DETECT
13	TEST	IN	5V
14	SYNC DET	IN	SYNC DETECT (NO SYNC: H)
15	HEAD SEL 2	-	NC
16	COL ROT	IN	COLOR ROTATION CONTROL INPUT
17	ENV COMP	IN	PB ENVELOPE COMPARATER INPUT
18	V. PULSE	OUT	V. PULSE ADDTION TIMING CONTROL
19	REC ST(H)	OUT	NORMAL AUDIO REC START: H
20	AV CTL3	-	NC
21	A. FF	OUT	AUDIO FF OUTPUT
22	EDS(H)	IN	VIDEO SIGNAL FIELD DETECT
23	REMOTE PAUSE	-	NC
24	HiFi REC ST(L)	OUT	HiFi AUDIO REC START: L
25	D FF	OUT	VIDEO PB FM (CH-1, CH-2) SWITCHING PULSE
26	BACKUP 5V	-	BACKUP 5V
27	AV CTL6	OUT	FRONT(LINE 2)INPUT SELECT
28	NC	-	NC
29	LMC 3	OUT	LOADING MOTOR DRIVE (3)
30	CASS SW	IN	CASSETTE TAPE LOAD SWITCH (CASS IN: L)
31	REC SAFETY	IN	REC SAFETY SWITCH DETECT (SW ON: L)
32	LS C	IN	MECHANISM MODE DETECT (C)
33	LS B	IN	MECHANISM MODE DETECT (B)
34	LS A	IN	MECHANISM MODE DETECT (A)
35	GND	-	GND
36	GND	-	GND
37	RESET	-	RESET
38	X IN	-	SYSTEM CLOCK
39	X OUT	-	SYSTEM CLOCK
40	CLK SEL	-	Hi FIXED
41	GND	-	GND
42	XC IN	-	TIMER CLOCK
43	XC OUT	-	TIMER CLOCK
44	LMC 2	OUT	LOADING MOTOR DRIVE (2)
45	LMC 1	OUT	LOADING MOTOR DRIVE (1)
46	RAE OUT	OUT	REMOTE PAUSE CONTROL OUTPUT
47	BIT SEL	-	NC
48	A. MUTE	OUT	AUDIO MUTE CONTROL
49	I2C DATA	OUT	DEMODULATOR CONTROL DATA OUTPUT
50	I2C CLK	OUT	DEMODULATOR DATA TRANSFER DATA

Table 6-1-1 SYSCON CPU pin function(1/2)

6.1.2 Syscon CPU pin function (IC701) 2/2

PIN NO.	LABEL	IN/OUT	NOTE
51	P. MUTE	OUT	PICTURE MUTE CONTROL (MUTE ON: L)
52	TU MUTE(H)	OUT	TUNER MUTE CONTROL (MUTE ON: H)
53	P. CTL	OUT	POWER ON/OFF CONTROL (POWER ON: H)
54	AV CTL B	-	NC
55	TU DATA	OUT	TUNING CONTROL SERIAL DATA OUTPUT
56	TU CLK	OUT	SERIAL DATA SHIFT CLOCK OUTPUT
57	LOCK(L)	OUT	TUNING LOCK CHECK
58	TU CE	OUT	TUNER UNIT CHIP ENABLE
59	CONV. CTL(H)	OUT	RF CONVERTER CONTROL
60	SP(L)	OUT	SP MODE: L
61	OSD CS	OUT	ON SCREEN IC CHIP SELECT
62	HEAD SEL	OUT	19u HEAD SELECT CONTROL
63	AV CTL2	-	NC
64	REC (H)	OUT	Hi Fi AUDIO REC MODE: H
65	AMP VCC	-	SYSTEM POWER (for AMP)
66	D. PG IN	IN	DRUM PICKUP PULSE INPUT (SWITCHING PULSE)
67	D. FG IN	IN	DRUM FG PULSE INPUT
68	C. FG IN	IN	CAPSTAN FG INPUT (TAPE SPEED / BACK SPACE COUNT)
69	AMP VREF OUT	OUT	CTL PULSE AMP REFERENCE VOLTAGE
70	(VCC/2)	-	2. 5V
71	CLAMPF	IN	CTL CLAMP CIRCUIT INPUT (POSITIVE PULSE)
72	CLAMPR	IN	CTL CLAMP CIRCUIT INPUT (NEGATIVE PULSE)
73	CTL AMP OUT	OUT	CTL PULSE OUTPUT
74	AMPC	-	CAPACITOR CONNECT TERMINAL for CTL AMP CIRCUIT
75	CTL AMP IN	IN	CTL PULSE INPUT
76	CTL (+) SW	OUT	CTL (+) SIGNAL OUTPUT
77	CTL (+)	IN/OUT	CTL (+) SIGNAL
78	CTL (-)	IN/OUT	CTL (-) SIGNAL
79	CTL Vss	-	Vss
80	GND	-	GND
81	BACK UP 5V	-	BACKUP 5V
82	VREF	-	Vcc
83	C	-	NC
84	POWER DET	IN	POWER SOURCE DETECT
85	END SENSOR	IN	TRAILER TAPE DETECT (DETECT ON: L)
86	TU LED	-	NC
87	AFT	IN	TUNING CHECK
88	AUDIO LEVEL (Rch)	-	NC
89	AUDIO LEVEL (Lch)	-	NC
90	AUDIO ENV.	IN	AUDIO PB FM INPUT
91	VIDEO ENV.	IN	VIDEO PB FM INPUT
92	START SENSOR	IN	LEADER TAPE DETECT (DETECT ON: L)
93	C. SYNC	IN	COMPOSITE SYNC
94	SSB DATA	OUT	VIDEO AND AUDIO IC CONTROL DATA
95	CAP REV(L)	OUT	CAPSTAN MOTOR CONTROL (FWD: H / REV: L)
96	SSB CLK	OUT	VIDEO AND AUDIO IC DATA TRANSFER CLOCK
97	STB	OUT	CLOCK OUTPUT PERMISSION
98	DATA O	OUT	ON SCREEN CONTROL DATA OUTPUT
99	DATA I	IN	ON SCREEN CONTROL DATA INPUT
100	S CLK	OUT	ON SCREEN DATA TRANSFER CLOCK

Table 6-1-2 SYSCON CPU pin function(1/2)